# The IRON AGE

The National Metalworking Weekly



Harry J. Johnson, M. D.

Memo To Executives: Take Time To Be Healthy P.55

f the Week P-2



TO QUALITY

#### STEELS

When you place your order with Copperweld you're on the inside track to the finest quality electric furnace steels available. Copperweld offers the most diversified line of leaded or unleaded alloy and carbon hot-rolled blooms, bars and billets.

STANDARD STRUCTURAL ALLOY • BEARING
QUALITY • ALLOY TOOL • NITRALLOY •
CARBON TOOL • SPECIALTY • MAGNAFLUX-AIRCRAFT QUALITY • Hot Rolled •
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• Machine Turned • Centerless Ground

COPPERWELD STEEL COMPANY
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## Tool Steel Topics



in the Pacific Coast Bethlehem products are sold Bethlehem Pacific Coast Steel Corporation BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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### Maker of Washers Rings the Bell with Die Made of Lehigh H

A manufacturer of steel washers found that by using a piercing die made of Lehigh H tool steel, he could get longer, more economical production runs than with dies of another grade, formerly used.

The Lehigh H die produces thousands of round washers daily, in sizes from 5/8 in. to 1 in. It is hardened to approximately Rockwell C 61, and pierces



5/32-in. C 1035 steel sheet. Because of the severity of the piercing operation, redressing of the die is required after every third turn, but only 0.020 in. is removed. Close to 100,000 washers are turned out between grinds.

Lehigh H handles this blanking job to perfection because of its outstanding wear-resistance and toughness. Lehigh H is a superb high-carbon, high-chromium grade of air-hardening tool steel. It can always be counted upon for a good job because of its resistance to wear, minimum distortion in heat-treatment, and high compressive strength.

#### TYPICAL ANALYSIS

Carbon 1.55 Molybdenum 0.80 Chromium 11.50 Vanadium 0.40

If there are applications in your shop which require a combination of wear- and shock-resistance, plus high compressive strength, look into the advantages of Lehigh H. Your local Bethlehem tool steel distributor, as friendly a man as you'll find anywhere, is at your service.

## FILM "TEAMWORK" WINS AWARD AT COLUMBUS FESTIVAL



"Teamwork," our new 30minute color film on tool steel, received an award for excellence in the Business and Industry category at the recent Fourth Annual Columbus Film Festival.

"Teamwork" takes you behind the scenes in describing typical applications of our carbon, oil- and air-harden-

ing, shock-resisting, hotwork and high-speed tool steels. It is now available for showings to die-makers, heat-treaters, machinists, machine-tool

manufacturers and distributors. It's also an excellent film for technical society meetings, and for student groups.

It's easy to arrange to see "Teamwork." All you need do is drop a line to "the nearest Bethlehem office, or to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. If possible, please select a showing date well in advance, to allow time for scheduling and shipping.

#### BETHLEHEM TOOL STEEL ENGINEER SAYS:



In precision punching it is common practice to make the punch diameter exactly the same as that of the desired hole. (All the clearance required is then applied to the I.D. of the die.) For many operations involving holes greater than 1 in. diameter, for example, and stock less than ½ in. thick, this procedure is correct. But in other operations it is incorrect, because the elasticity of the stock causes the holes to close-in after punching, so that the holes are actually smaller than the punch which made them.

With large-diameter holes and thin stock, the elastic springback which tends to close-in a punched hole causes the stock to buckle instead, so that the hole diameter will be accurate under these conditions. On holes 1 in. in diameter and smaller, expect a close-in of 0.002 to 0.003 in. with stock  $\frac{1}{8}$  in. to  $\frac{1}{4}$  in. thick, and a closing of 0.001 in. on stock 0.030 in. thick (22 gage). Closing will be negligible on stock 0.010 in. thick (32 gage) or less. For precision punching, therefore, add the expected close-in to the punch size to produce the correct hole diameter.

Nov. 8, 1956-Vol. 178, No. 19

## . IRON AGE

### Digest of the Week in Metalworking

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#### NEWS DEVELOPMENTS

#### WILL MIDDLE EAST CRISIS BRING CONTROLS?

P. 58

Strict controls unlikely in present crisis. Guns and butter theory is



still the rule. Stockpile may get new attention, particularly in materials that have been coming in slowly. Long range tanker program sidetracked for mothballed tankers.

#### GOVT. URGES INDUSTRY TO

PLAN AGAINST ATTACK

P. 59

Washington planners are urging businessmen to pay particular attention to continuity of management, as well as continuity of production, in the event of atomic attack.

#### STRIKE TORPEDOED

3RD QUARTER EARNINGS

Effects of five-week shutdown are clearly evident in income reports. However, strong demand is creating a good last quarter with operations at full capacity seen for first half of coming year.

#### CASTINGS BUYERS WANT

BETTER QUALITY

P. 61

Gray Iron Founders' survey shows PA's pay more attention to quality than price. But they also admit they need more education on castings. Survey indicates more personal attention on part of foundrymen would pay off.



IT'S POSSIBLE to be successful and healthy, too, says Dr. Harry Johnson. Dr. Johnson knows whereof he speaks when he advises (on page 55) industry executives on how to stay healthy despite the pressures of modern business. He specializes in examining and advising managements on health and related problems.

#### NEW ANTI-TANK WEAPON SMALL BUT DEADLY

P. 63

The "Ontos" carries as much armament as a field artillery battery and is capable of knockouts on heaviest of tanks. Its welded armor simplifies production fabrication. Marines are enthusiastic about the unit, have placed an order with Allis-Chalmers for several hundred.

#### FEATURE ARTICLES

#### NEW HEAT TREATMENTS IMPROVE BERYLLIUM COPPER P. 95

Beryllium copper has undergone a number of significant changes in recent years. Composition has been altered to conserve beryllium, simplify machining and forming. New heat treatments require different aging times and temperatures. Net result is an overall superior material with other advantages including improved strength, better conductivity and resistance to fatigue.

#### NO-DRAFT FORGING UNCORKS A BOTTLENECK P. 99

Aluminum forgings play a big part in airframe production. Draft angles required for removal from dies have been a drawback. Previously they could be taken off afterwards by machining or left on with a loss in efficiency. Heavy Aluminum found a third way—no-draft forgings. Their military and commercial forgings are produced draft-free and in volume.

#### HANDLE CHIPS EFFICIENTLY FOR GREATER SHOP PROFITS P. 102

Crushing techniques are considered in this second article of a series on efficient chip handling. It describes how conveyorized magnets, crushes and other devices are being used effectively in many chip-producing shops and plants. Today's crushers, for example, permit shipping turnings in one-third the space.

#### CARBIDE-TOOLED LATHE THREADS TOUGH ALLOYS EASILY P. 104

An answer to threading high strength pipe and couplings with precision, speed and economy could be a quick-set-up lathe which features single point carbide tooling. Lathe is automatic, can thread toward headstock or tailstock. Threading tool is carried in a boring bar, works in conjunction with a rotating chip cutter.

#### TWO-STEP PROCESS RETARDS WHITE RUST P. 106

Striking directly at two trouble spots in old problem of white rust on galvanized steel—water and condensed moisture—is a two-dip treatment method. First step is formation of a relatively stable, water-repellent film on galvanized surface. Second dip in chromic-type solution improves the protection.

#### MARKETS AND PRICES

#### SUEZ CRISIS THREATENS TIN SUPPLY

Tinplate producers see possibility of both supply and price problems if the issue is not eased in about 30 days. Tin which formerly went through the Suez Canal has been rerouted. However, internal strife in Singapore has held up some loadings. Deliveries

#### METAL FOIL WRAPS UP BIGGER MARKET

P. 64

The metal foil industry, highlighted by aluminum foil, will sell less in 1956 than it did in 1955. However, the industry is happy because the upward trend is maintained. Key to the difference is fact that government chaff buying has stopped.

#### AUTOMAKERS PLAN ENGINE RETOOL FOR '58

P. 72

Barely catching their breath after 1957's \$1 billion changeover program, automakers are eyeing 1958 models. Prospect: More retooling expenses under the hood. Horsepower probably will increase. Expectation is for at least three and possibly four new engines in 1958 models.

#### GOVT. COMPETITION WITH

P. 77

Administration quits 500 operations in competition with private business. Defense Dept. alone halts 355 commercial activities. Move results in turning over more than \$1 billion to U. S. Treasury. Money came from RFC liquidation, sales to private sources.

#### SUEZ MAKES STEEL BUYERS TAKE ANOTHER LOOK P. 151

International tensions are forcing steel users to review inventory policies. Pressure building up for delivery of orders on books. Automotive upsurge will tighten first quarter. '57 may be record year.

#### NEXT WEEK

#### PROS AND CONS OF HEAT TREAT STOP-OFFS

running about 2 weeks late.

Heat treat quality often depends upon the choice of the proper stop-off. Shall it be copper plate? Bronze? One. of the newer stop-off paints? Here's a simple guide to choosing wisely, thriftily. (Surface Combustion Corp. photo)



this man uses radiography for product control



\*80 a month
invested in equipment
SAVES him thousands
a year in needless rejects
...his customers are happy

this man



high reject rate
(correctable by radiography)
COSTS him thousands
a year in needless waste
...his customers how!

Makes no difference what you make or buy or sell... if it needs "seeing into" for quality control, radiography (gamma or x-ray) can probably profit you, as it does others.

Talk it over with your local Picker representative \* or write us outlining your problem and, if possible, sending typical samples. We'll make tests and tell you frankly whether radiography holds any promise for you.

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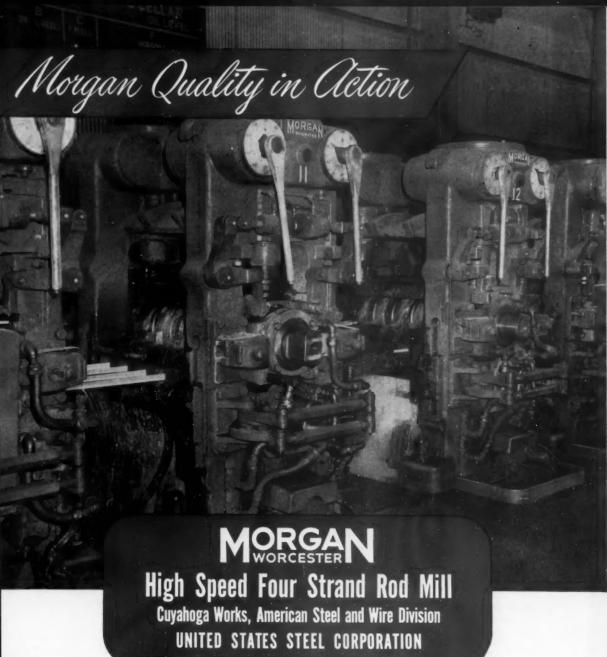
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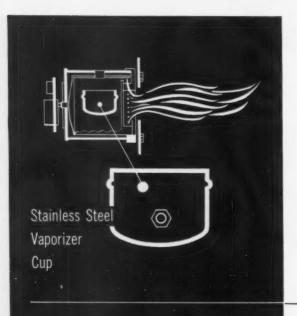
Morgan Mills are known to steel men throughout the world for their sound design and accurate manufacture . . . an enviable reputation which has assured mill users of efficient and trouble-free operation. Morgan Mills have kept pace with the ever-increasing demands for high output and greater accu-

racy of product.

#### MORGAN CONSTRUCTION CO.

WORCESTER, MASSACHUSETTS

ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS WIRE MILLS EJECTORS REGENERATIVE FURNACE CONTROL



# Stainless Steel replaces cast iron in burner cup... saves 60¢ a part, cuts weight 90%

#### Big cost savings . . .

#### OLD CUP

(Cast Iron-1.2 to 1.4% chromium)

Cost of casting \$1.090

Machining grinding, boring, drilling, tapping 0.274

(Material and Labor)

#### NEW CUP AND SPUD

(Type 304 Stainless Steel)

 Cup material
 \$0.330

 Spud material
 0.100

 Drawing
 0.119

 Welding
 0.200

 Punching, beading cup and Machining spud
 0.132

 Total
 \$0.881

 (Material and Labor)

Material and Labor Saving \$0.483 (35%)
Overhead Saving 0.122

Total Saving, per cup. \$0.605

About a year ago a manufacturer of oil burners changed specifications from cast iron to stainless steel for this vaporizer cup.

It saves him \$0.605 on each part—35 per cent on materials and labor alone—and practically eliminates service failures.

By welding a stainless steel spud (machined from 34" hexagon-shaped bar) to the cup (drawn from .028 Type 304 stainless strip) the burner producer gets a more dependable part at much less cost.

The vaporizers formerly used not only created service problems but took a high toll in tool grinding and replacement costs. Switching to stainless ended this headache too.

#### Weight cut 90%

Weight went down with costs. The cast iron cup weighed 5 pounds; the stainless cup weighs only ½-pound. What's more, the stainless cups are virtually immune to "burn-out."

#### It's Armco for Stainless

Armco's wide variety of stainless steels makes it possible for you to select the one right grade for your products. We produce all standard and many special grades in sheets, strip, plates, bars and wire. Get more information about Armco Stainless Steels by calling the Armco Sales Office near you, or writing us at the address below.



## Armco Steel Corporation

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#### EDITORIAL

#### Our Foreign Policy Is Sound!

◆ IF IT IS NAIVE for us to believe that freedom belongs to all the people in the world, then our policy is naive. If living up to our commitments without ulterior motives is being immature, then America is immature in its foreign policy.

If acting as we preach hurts our friends when they have given lip service to our beliefs, then it is too bad. If it is painful for us to take a stand that prevents us from becoming an international hypocrite, that's our worry.

If our friends attack—and in our opinion violate—the spirit of the United Nations, we must condemn this action. If other friends reactivate the policy of might is right, we lose face in the name of the Almighty if we condone it.

If in the interest of simple rights, America takes an unpopular stand, should we drag our feet or should we stand up and be counted? If we believe in the United Nations' Charter, have we any right to become privy to secret deals, "mature" actions and the modern double cross?

We and our allies—England and France—are on the outs. The messages that Mr. Eisenhower sent to those countries deploring their attitude on the Egyptian-Israeli explosion were right on the line. He could not have done otherwise.

If our attitude irks England or France, it is too bad for all of us. That also is part of American foreign policy—a policy that favors freedom, non-aggression and peaceful methods via the United Nations.

Neither England nor France felt it necessary to consult or get in touch with American officials before an ultimatum was read—with threats of force—to Egypt and Israel. America, whose history, pleadings and statements support freedom for small as well as large nations, can ill afford to talk out of both sides of her mouth.

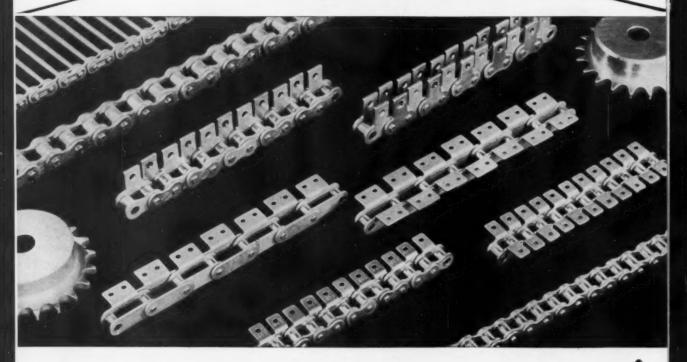
We will not become permanently estranged from our major allies. We have told them how we feel; we have taken our stand. That is enough to show the world our intentions.

If we must stand alone, that too is all right. But if we have to tread that path we had better be prepared—physically and morally.

Tom Campbeec

EDITOR-IN-CHIEF

## it's NEW! it's Revolutionary it's Electrofized |-



## ATLAS ROLLER CHAIN

CORROSIVE RESISTANT...COSTS 40% LESS
COMPARATIVE TESTS PROVE IT WEARS 100% LONGER

From coast to coast manufacturers, engineers and transmission drive specialists are acclaiming this as the most revolutionary development in the roller chain field. It meets the most exacting requirements of the chemical, food, beverage and other industries where corrosion resistance is a factor. Yet it has been tested and proved to outlast, outrun and outwear other chains even though it costs far less.

HIGHER TENSILE STRENGTH—has same tensile strength as alloy steel chain . . . much higher than bronze or stainless steel chain.

LONGER WEARING—actual wear-drive tests prove it lasts as much as 100% longer than alloy steel chain.

STAINPROOF, CORROSIVE RESISTANT—corrosion resistance is greatly increased in Electrolized Chain and compares favorably with any other corrosion resistant chain now on the market.

LOWER PRICE—of Atlas Chain makes it as much as 40% less in cost than any other corrosion resistant chain now on the market.

Here's the chain that makes it possible for you to reevaluate the specifications of your transmission drives. From the standpoint of cost, efficiency and longer wear it allows you to specify corrosion resistant chain on drives previously ruled out due to high cost and short chain life.

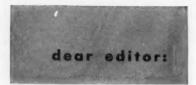
You owe it to your plant to contact your nearest Atlas distributor to get the complete story on Atlas Electrolized Roller Chain and Sprockets. He can help you attain a new standard of efficiency on your transmission drives.

ATLAS CHAIN AND MANUFACTURING CO.
West Pittston, Penna.



## GET THIS DATA ON

This free brochure tells you in brief question and answerform all about Electrolized Chain. W-1n for your copy teday.



#### letters from readers

#### **Bucking The Tide?**

I have just finished reading your October 11 editorial, "Is There Too Much Credit?" Not only was I impressed by your keen analysis of the subject, but also by the fact that you are bucking a mass hysteria which seems to have permeated the thinking of most of our leaders in finance today. Such independence of thought is indeed a rarity. J. Darrah, President, Metalcraft, Inc., Huntington, W. Va.

#### **One-Two Operation**

In the September 13 issue of THE IRON AGE there is a "Newsfront" item about flashless flash-butt weldine.

We are interested in knowing more about the new machine now available which welds and shears resulting flash in a one-two operation. E. F. Gosz, Purchasing Agent, Invincible Metal Furniture Co., Manitowoc, Wis.

For further information write Thomson Electric Welder Ca., 261 Pleasant St., Lynn, Mass. Also, see September 20 fea-ture article "New Flash Welder Trims Flash As It Welds."—Ed.

#### **New Addition**

Sir:

Congratulations on another fine article-Survey Report to Management No. 2-"How To Hit Your Market" which appeared in your August 30 issue.

Would you kindly send the writer two reprints, if still available at this late date? We would like to make it part of our marketing library. S. Dosik, American Instrument Co., Inc. Washington. D. C.

Copies are still available.—Ed.

#### We Hope So, Too!

We have been subscribers to THE IRON AGE for more than 30 years and trust we will for 230 more!

Will you please add our name to your subscription list for THE IRON AGE Tool Steel Directory and bill us accordingly? H. C. Nazer, H. H. Bell Steel Co., Carlstadt, N. J.

The directory will be available soon. Single copy price is \$2.00.-Ed.

#### **Quality Control**

I have read the article, "How to Get More For Your Inspection Dollar," in the September 27 issue and I feel it is an excellent presentation on the position and objectives of quality control in modern industry.

If you can supply me with 30 copies of this article. I would like to make them available to various members of management, both at the division and at the plant levels. P. E. Hile, Quality Control Mgr., Eastern Div., Continental Can Co., Inc., New York, N. Y.

Copies are still available.



"I don't care how bad his work isquality control will have to find another way!"



#### here are 0 "reasons why" you'll be interested in DI-ACRO\* ROLLERS

1 Cam actuated idler rollsive feature-makes it possible to form small circles in one operation.

2 Larger circles are formed in two operations. No limit to maximum radius.

3 Bends are located at any point in metal—with straight sections on both sides of the bend.

4 Material other than sheet is also formed. Special rolls supplied for spe-cial forming jobs.

5 Eight models. Rated capacity to 16 gauge. Forming widths from 6" to 42".

6 Di-Acro Rollers are easy to operate. 7 Adjustments can be "locked in"—hundreds of parts precisely duplicated.

8 Long, trouble-free service, all ma-chines backed by warranty.

9 Engineering Service at your disposal for the life of the machine 10 Delivery is good. Cost is too.

\*pronounced Die-ack-ro



#### WANT MORE INFORMATION?

New catalog gives complete details on all hand and power operated Di-Acro machines.

Consult the vellow pages of your phone book for the name of nearest Di-Acro distributor or write us.



Creators of 'DIE-LESS DUPLICATING"

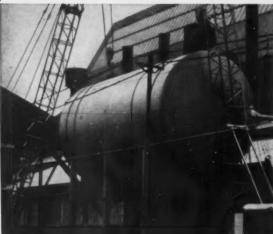
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### G.T.M. completes another "turn-key" tank lining job

FOR stream pollution abatement, an eastern steel mill needed a number of big tanks to collect and treat waste pickle liquor—four 45,000-gal. storage tanks, three 41,000-gal. storage and leaching tanks, and five smaller tanks.

The G.T.M.—Goodyear Technical Man—recommended lining the tanks with PLIOWELD—especially compounded corrosion- and abrasion-resistant rubber. He also agreed to handle the complete job "from blueprints to saddles." This included procurement of tanks, lining at fabri-

cator's plant, and movement by barge and truck to customer's plant. And this involved hiring movers and equipment, obtaining rights of way, moving telephone and electrical wires, making police and traffic arrangements.

The net result was a "turn-key" job, delivered as ordered, with no problems for the customer. Like to have your lining job handled the same way? Just turn it over to the G.T.M.! Contact him through your Goodyear Distributor, or write Goodyear, Industrial Products Division, Akron 16, Ohio.

PLIOWELD TANK LININGS by



#### fatigue cracks

#### Post-Election Memo

Writing in the August 18, 1955 issue of THE IRON AGE, West Coast columnist R. R. Kay said: "It looks as if Hell's Canyon will replace Dixon-Yates as a big issue in the 1956 Presidential campaign next year."

Now that the ballots are counted we'd just like to remind you that the public vs. private power issue was a big one in the campaign, that Dixon-Yates made few headlines but that Hell's Canyon controversy worked out just as our Mr. Kay predicted.

#### Take It Easy

If you've been reading this column at a breakneck pace-slow down. And if you want to know why, just turn to p. 55 and read Dr. Harry Johnson's article "The Ten Commandments of Executive Health."

In this special article for THE IRON AGE he gives you some common-sense pointers on how to keep healthy in face of present day business pressures. He should know, too. As head of Life Examiners Institute he has been counseling business people health problems for years.

Not only that, but he is a good example of the man who practices what he preaches. With himself and his staff, he firmly believes in a steady, efficient working day and is just as firmly against taking office problems home, late meetings and missing the commuter trains from New York City.

#### Author, Author!

When we read about the young British engineer who recently left a responsible position with an aircraft firm to compose symphonic music we began to wonder. It's probably safe to assume that his years of industrial experience will turn up in some of his musical phrasings: the roar of an engine, for example, or the popping of a wing-riveting gun.

If the aircraft phase of metalworking can lead to serious music maybe the overall picture our boys get could eventually stir one of them to produce the "Great American Novel." If we detect any faint stirrings toward something like "The Openhearth and I" or "How Green Was My Anodized Finish" -we'll let you know.

#### **Puzzlers**

What about those bees? The way we see it, the hive was half full at 11:59 AM and it was one quarter full at 11:58 AM. Those splendid citizens who saw it the same way were F. Stuart Mott. Leon Parsons and G. W. Cunningham of the U.S. Steel Export Co; P. E. Rodman, Aluminum Specialty Co; Edward A. Bell, Springfield Gas Light Co; Manuel Lo Verso, Collins Machinery Corp; R. O. Bailey. American Chemical Paint Co., and many others.



"It's a little early for Louie-just aim him at the coffee machine!"

#### **Perforated Materials** for Every Application

Contact H & K for any perforated materials your



We will be glad to work with you on your perforat-ing problems.



Perforating all etals, Masonite, plywood, paper, cloth and plastic.



Fill-in and mail coupon to office and



different patterns



See our catalog in Sweet's Product Design File.



Round holes, square holes, alots, orname

patterns, oblong holes, oval holes.



Please send me
GENERAL CATALOG NO. 62
STOCK LIST of Perforated Steel Sheets
SAMPLES of Perforated Plastics and Paper
PRICE INFORMATION (NOTE, Send specifications of perforated materials wanted. If necessary send drawings or sketches.)
NAME
TITLE
COMPANY
SYREET

ZONE

CITY.

Square locked head maintains ACCURATE alignment

Box section arm fully encloses driving shaft

100% Anti-friction bearings

LIVED ACCURACY

in this <u>high speed</u>
Super Service
Radial!

Arm swings with finger tip ease

No driving clutches

in perfect balance on arm







Drilling, Core Drilling and Reaming Alloy Steel Cheek and Counterweights of Aircraft Engine Crankshafts. Reamed holes are held accurate within .0005". 3 and 4 foot arm.

Spindle speeds up to 3500 r.p.m. without belts.

This simplified, very versatile, speedy, accurate and durable machine is rigid and easy to handle.

A distinctive feature is the elimination of spindle driving clutches as forward and reverse rotation is thru a reversing motor ... very fast for tapping work.

Furnished with 9" column with 3' or 4' arm and 3 HP driving motor.

Get the details. In their range, these machines are most economical and productive.

Write for Bulletin R-21C.

BICKFORD



RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION

GIDDINGS & LEWIS MACHINE TOOL COMPANY OAKLEY, CINCINNATI 9, OHIO, U.S.A.

## dates to remember

#### NOVEMBER

National Electrical Manufacturers Assn. Annual meeting, Nov. 12-16, Traymore Hotel, Atlantic City, N. J. Society headquarters, 155 E. 44th St., New York

Investment Casting Institute—Annual meeting, Nov. 13-15, Sheraton-Cad-illac Hotel, Detroit. Society head-quarters, 27 E. Monroe St., Chicago 3. III.

Farm Equipment Institute-Fall Meeting, Nov. 15, La Salle Hotel, Chicago. Society headquarters, 608 S. Dearborn St., Chicago,

#### EXPOSITION

Third International Automation Exposition-Nov. 26-30, New York.

National Assn. of Waste Material Dealers. Inc .- Fall meeting, Nov. 15-19. Hollywood Beach Hotel, Hollywood, Fla. Society headquarters, 271 Madison Ave., New York.

The American Society of Mechanical Engineers-Annual meeting, Nov. 25-30, Statler Hotel, New York. Society headquarters, 20 W. 39th St., New York.

Wire Reinforcement Institute, Inc.-Fall meeting, Nov. 26-27, The Jung Hotel, New Orleans, La. Society headquarters, National Press Bldg., Washington 4. D. C.

Society for the Advancement of Management-Annual operations research conference, Nov. 26-30, Hotel Commodore, New York. Society head-quarters, 74 Fifth Ave., New York.

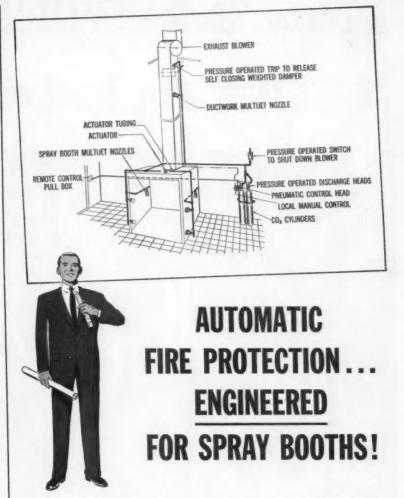
#### DECEMBER

Institute of Appliance Manufacturers-Year-end conference, Dec. 3-4, Netherland Plaza Hotel, Cincinnati, O. Society headquarters, The Shoreham Hotel, Washington, D. C.

American Institute of Mining, Metallurgical, and Petroleum Engineers Annual conference, Dec. 5-7, Morrison Hotel, Chicago. Society headquarters, 29 W. 39th St., New York.

American Institute of Chemical Engineers-Annual meeting, Dec. 9-12. Statler Hotel, Boston. Society head-quarters, 25 W. 45th St., New York.

The Material Handling Institutenual meeting, Dec. 10-11, Biltmore Hotel, New York. Society headquarters, One Gateway Center, Pittsburgh,



SPRAY BOOTHS can be tricky -safe one minute, ablaze the next. Because they are a special kind of fire hazard, spray booths demand a special kind of fire protection. Like a Kidde Automatic CO2 Fire Extinguishing System.

By means of rate-of-temperaturerise detectors, a Kidde system spots and smothers-even the most vicious blaze the instant it begins . pouring clouds of CO2 over the flames through wide-dispersion Multijet nozzles.

Thanks to the nature of clean, efficient CO2, a Kidde system leaves no mess to clean up. CO2 will not harm production equipment or work-in-process . . . it snuffs the fire, then vanishes.

Furthermore, Kidde systems are of

the most advanced design. They use no falling weights, no old-style mechanical triggering methods. Instead, Pneumatic Control Heads insure an instant and complete discharge of CO<sub>2</sub>.

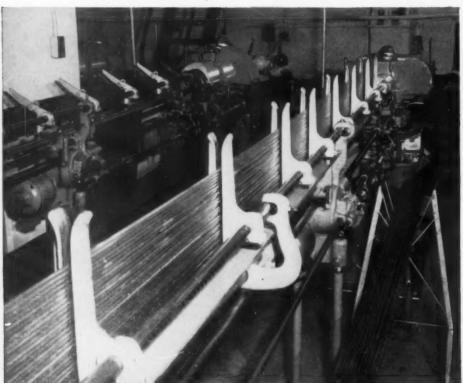
In Kidde tamperproof systems, each moving part is self-encloseda safety measure to prevent accidental discharge. And easy-to-read visual indicators show quickly whether the system is "set" or "released." Finally, there are special Directional Valves which let you protect more than one hazard from the same bank of cylinders - a feature that means the most versatile of fire protection.

For more information on the best in fire extinguishing systems, and help in solving your specific fire problems, write Kidde today.



Walter Kidde & Company, Inc. 1149 Main Street, Belleville 9, N. J.

## How "MASTER" put a USS Amer-Led hikes

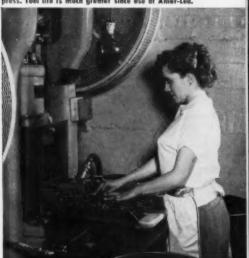


Feed end of the Brown and Sharp automatic screw machines. A couple of dozen Amer-Led reds can be stacked at one time.

Business and of the screw machines. Increased production was most noticoable here, where shackles are cut, formed and drilled.



Breaching is performed on this Zeh and Hahneman taggle press. Tool life is much greater since use of Amer-Lad.



THE IRON AGE

## padlock on costs... production 25% to 75%

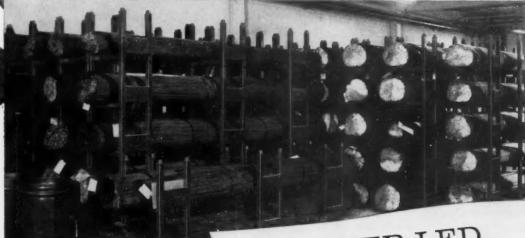


When American Steel & Wire first developed Amer-Led free machining stock, it was suggested to Master Lock and it worked like a charm. Automatic screw machine production leaped 25% to 75% without any increase in tool wear! The finer grain structure of this new steel permitted more accurate cutting to closer tolerances, and there were fewer rejects, too.

Punch press production increased 15% to 20%, and was limited only by the ability of the operator to feed the machine. Although production was not increased in the broaching operation, tool life was increased.

Of course, this is the story of Master Lock Company. If you yearn for results like this, then get in touch with your AS&W representative. Ask about USS Amer-Led.

Schoolboys can identify a "Master" padlock with its unusual laminated steel case. The shackle is possibly the most important part. Miscreants try to twist it off with a crowbar, or sever it with hacksaw or rasp. Obviously, the shackle must be hard and free from brittleness after heat treatment; and during production it must be ductile and machinable.



The Amer-Led is stored as received—in steel strapped hundles. There's a type for most machining operations.

#### AMERICAN STEEL & WIRE

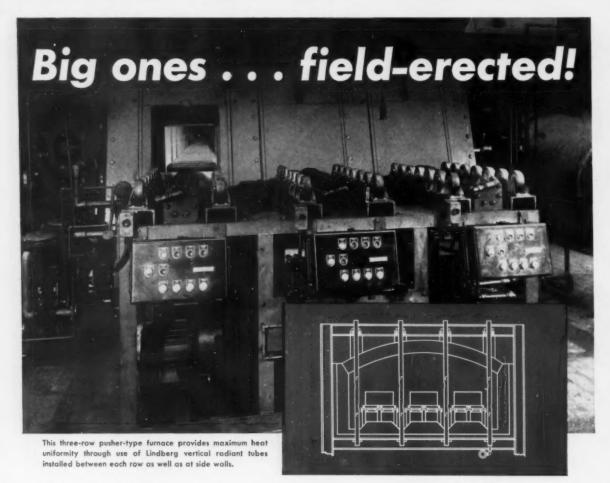
DIVISION, UNITED STATES STEEL
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA SIEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMER-LED SUPER-MACHINING BARS



UNITED STATES STEEL



#### If it's a big furnace you need . . . better talk it over with Lindberg

A big automatic pusher-type furnace like the one illustrated is just one of the many types of field-erected equipment Lindberg Industrial can provide industry.

We field-erect big heat treating furnaces, melting furnaces, enameling furnaces, ceramic kilns . . . electric or fuel fired . . . for any application of heat to industry.

Lindberg's years of experience in the broad field of industrial heating equipment, its staff of expert laboratory technicians and experienced application engineers assure your getting the best suited installation for your process and production requirements.

Whatever your needs, if it has anything at all to do with the application of heat to industrybetter talk it over with Lindberg.



The Lindberg vertical radiant tube used in this installation weighs only 36 lbs., is only 84" long. Can be changed easily in a few minutes.

Exclusive "dimple" design insures uniform heat over designated length of tube.

These tubes provide ideal heating for controlled atmosphere furnaces.

For any type of industrial heating or processing operation, Lindberg provides a complete analyzing, designing and construction service including completed installation in your own plant. To get immediate, on-the-spot service from an expert Lindberg engineer call your nearest Lindberg Field Office (see classified section of your telephone book) or write us direct.

## LINDBERG



#### INDUSTRIAL CORPORATION

Specialists in Field-erected Equipment

LINDBERG Chicago Plant: 2321 West Hubbard Street, Chicago, Illinois INDUSTRIAL Los Angeles Plant: 11937 Regentview Ave. at Downey, Calif.





An 80% machining advantage... as well as superior mechanical properties are obtained by the switch to ductile iron castings for this turret lathe and other machine tools produced by The Warner & Swasey Company, 5701 Carnegie Avenue, Cleveland 3, Ohio. Shown above are typical parts now cast in ductile iron to cut both production and maintenance costs. Combining the best features of cast iron and steel, ductile iron is easy to cast and machine, yet provides high strength and toughness.

## Warner & Swasey improves 275 turret lathe parts with ductile iron

Clutch plates, hinges, levers, tool holders, wrenches ... 275 parts in all ... are now specified in ductile iron for Warner & Swasey turret lathes.

#### MONEY-SAVING MACHINABILITY

was one reason for Warner & Swasey's adoption of ductile iron. The machine shop reports an 80% advantage in machining operations for ductile iron castings over the malleable iron parts they replaced. The ductile iron castings cut readily and evenly at hardness levels of 170-190 BHN. This means worthwhile savings in machining costs, but there are other advantages, too.

#### HIGH MECHANICAL PROPERTIES

Ductile iron castings provide a combination of strength, hardness and toughness that makes them

dependable for severe use in machine tools. Specifying ductile iron type 60-45-10, Warner & Swasey finds the castings provide an average yield strength of 56,250 psi and elongation of 16%. These parts also have a high level of wear resistance.

#### AND CASTABILITY

The good fluidity of ductile iron permits filling intricate molds . . . improving quality of the castings and quantity of output regardless of wide variations in section thickness.

You, too, can cut machining costs and improve your products or equipment by using ductile iron castings. Get all the facts in "DUCTILE IRON, The Cast Iron THAT CAN BE BENT." Write for your copy now.



ductile iron . . . the cast iron that can be twisted and bent 67 Wall Street, New York 5, N. Y. The INTERNATIONAL NICKEL COMPANY, Inc.



## **GRUELING DEMOLITION CONTEST FAILS TO FLAKE TI-CO!**



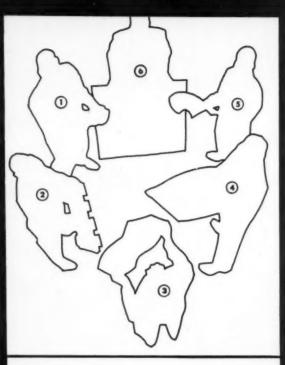
STOCK CAR DRIVER inspects sheet of Ti-Co after battering in demolition race. No trace of coating failure could be found.

The brutal "demolition race" is one of the top crowd-pleasers in stock car racing. Each driver is bent on smashing his opponents out of the race . . . last car still moving is the winner! This grueling automotive mayhem at Chicago's Soldier Field provided the setting for an unusual demonstration of the toughness of the zinc coating on Inland Ti-Co galvanized sheets. A sheet of Ti-Co was lashed to the rear of one of the doomed jalopies. Car after car rammed it head-on, at speeds up to 50 m.p.h. After half an hour of constant

crashing, battering punishment, the car was finally ready for the junk heap . . . but the zinc coating on the Ti-Co sheet had stayed put! Closest examination revealed not a trace of coating failure anywhere.

This test is, to be sure, rather unusual . . . but the Ti-Co coating has survived even tougher tests without cracking, flaking or peeling. Turn the page for more facts about how Ti-Co can cut your manufacturing costs, improve your products and add greatly to their useful life.





Shown (at the left) are six typical severe forming jobs now being accomplished with Inland Ti-Co: (1) deepdrawing, (2) roll-forming, (3) Pittsburgh lock-seaming, (4) spin-drawing, (5) crimping, (6) perforating.

# INLAND TI-CO GALVANIZED SHEETS TAKE THE TOUGHEST FORMING OPERATIONS IN STRIDE

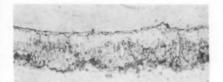
Any product that can be formed with steel can be formed with Inland Ti-Co. Ti-Co's ability to withstand even the most severe forming without cracking of the zinc coating makes possible many new galvanized steel products.

The zinc coating on Ti-Co is not only extemely tough but has just enough pliability to actually flow with the base metal as it's formed. Both on the production line and in extended usage, the Ti-Co coating has proved its ability to withstand punishment without leaving the slightest opening for rust to get a foothold. Unlike the conventional galvanized, products made from Ti-Co do not require re-dipping or "touch-ups" after fabricating, and rejects are greatly minimized. Ti-Co products can be depended upon for long service.

## THE SECRET OF INLAND'S NON-FLAKING TI-CO

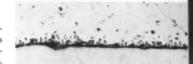
Inland Ti-Co galvanized steel is made by the patented Sendzimir process, a continuous operation in which the heat treatment of the strip and the application of the zinc coating are performed in one continuous galvanizing line. This process eliminates the brittle iron-zinc alloy layer, that causes flaking in conventional galvanized sheets, and results in production of a sheet on which the zinc adheres so tightly that it can be severely formed without flaking of the coating.

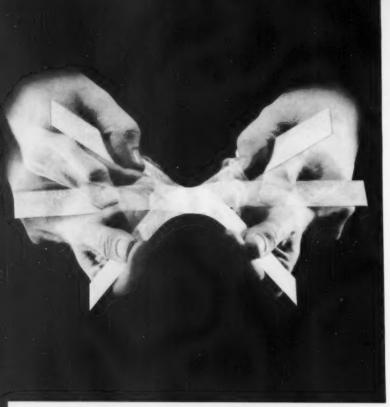




Photomicrograph reveals hard, brittle iron-zinc alloy layers which cause flaking in conventional galvanized steel.

Alloy layers are virtually eliminated in galvanized sheets made by the Ti-Co continuous process of galvanizing-





HOW YOU CAN TEST TI-CO. Take a piece of the galvanized steel you are now using and bend it back and forward on itself several times. If the coating flakes or peels, it's not Ti-Co. For a free sample of Ti-Co to use in making your own "bend test" comparison, please write to Department 297.

## WHY YOU CAN BE SURE OF TI-CO'S QUALITY

Samples from every order of Ti-Co are put through a series of tests far more severe than ever demanded of a galvanized sheet in normal fabrication.

In addition to the coating tests shown below, the Ti-Co quality control routine includes the following tests: Olson Cup test for ductility; Rockwell Hardness test; Weight for Coating test for uniformity; Fluting test of resistance to cross-breaking; Microstructure test for tightness of coating.



LOCK SEAM TEST. The tough 180° bend of a Pittsburgh lock seam is a supreme test of fabricating qualities. Ti-Co takes it!



IMPACT TEST. Rounded punch hammered into Ti-Co sheet dents the steel. But the Ti-Co coating "gives" without cracking.



BEND TEST. Hammered flat to a 180° bend, the Ti-Co coating shows no sign of cracking or flaking after repeated pounding.

## INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois Sales Offices: Chicago • Milwaukee • St. Paul • Davenport St. Louis • Kansas City • Indianapolis • Detroit • New York







equipment is necessary for survival.

In the fabrication of freezer baskets, for example, Peerless makes 45 cross wire welds simultaneously with one stroke of the welder, an unusual demand that can be satisfied only by the Sciaky patented Three-Phase principle of operation. Equally as important, Sciaky Three-Phase control eliminates burrs and splashes at the weld.

Dishwasher baskets have 124 welds made in twelve strokes-another big saving in time and handling.

Jobs like this provide good examples of the concept behind Sciaky Resistance Welding Techniques . . . to put the profits back into manufacturing.

Another example of how the Sciaky technique of fastening is used in cross wire products is given in "Resistance Welding At Work", Vol. 3, No. 9. Write for your free copy, today.

Upper-All the welds of a side web being made simultaneously. Lower-View showing the multiple electrode tooling that makes 45 welds per stroke.

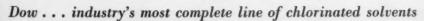
#### FOR SPECIFICATION WELDING

If you must do precision welding such as required for air frame, jet engine and ordnance manufacture, ask about the new Sciaky Predetermined Electronic Counter Weld Control. Write for Bulletins 338 and 339.

Largest Manufacturers of Resistance Welding Machines in the World











## "We solved a stubborn stripping problem by switching to Dow Methylene Chloride,"

says Edward J. Seitz of Lycoming

A vapor degreaser, a surfactant and Dow Methylene Chloride were the combination that Lycoming Division of Avco Manufacturing Corporation recently employed to solve a difficult stripping problem.

Edward J. Seitz, Supervisor, Special Process Engineering, put it this way: "We incurred a lot of trouble in removing the stop-off lacquer used on steel and aluminum parts, which are selectively plated. The lacquered parts had to be soaked in thinner and then periodically brushed to remove the softened lacquer. The parts then had to be rinsed in clean solvent. Another drawback was that the thinner was flammable.

"Since we switched to methylene chloride, we strip our parts in one operation. The parts are suspended in methylene chloride vapors or solvent contained in a degreaser until the lacquer is removed, and then rinsed with clean methylene chloride by means of a spray lance. This one operation takes but a few minutes, and has eliminated a fire hazard and proved a time and money saver."

Dow Methylene Chloride may be used as a vapor degreasing medium in many applications. It effectively cleans heat sensitive

parts which cannot be degreased with higher boiling solvents. A safe solvent, methylene chloride is nonflammable and carries a low toxicity rating. It's available through the same Dow distributor who supplies Dow Perchloroethylene Industrial and Dow Trichloroethylene for vapor degreasing, and Chlorothene® for cold cleaning.

Let us send you technical information about your specific requirements. Return the coupon today to the dow Chemical Company, Midland, Mich., Dept. S-953A.

	OF THIS INFORMATION MAIL COUPON TODAY PANY, Dept. S-953A, Midland, Michigan
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you can depend on DOW SOLVENTS



the latest word in low cost machining

## televersal

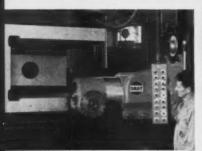
This new GRAY TELEVERSAL head tremendously increases machining range. Conveniently applied, quickly positioned, its great rigidity permits highest horsepower milling cuts.

The large diameter quill may be swiveled to permit any angular cut. A triple-straddle clamp inflexibly locks the quill to the cast pyramid body.

Designed to keep the job low and yet permit great machining range. Ideal when used with column cross travel of the new GRAY horizontal, boring, drilling and milling machine.

Not just an attachment, but a high power massively built, heavy milling unit that offers a new concept in versatility.

The G. A. GRAY Co., Cincinnati, Ohio

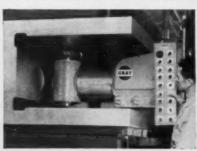


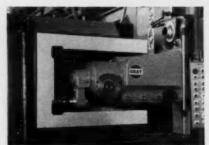




six different surfaces and more... and only ONE work-setting











The Metal Man Says:

in boyish escapades, it's foolhardy . . . but in business, it's wise to

go to the top!

At the very top of the non-ferrous metal scrap recovery industry, you'll find NAWMD members . . . old, established names in American business.

NAWMD members constantly strive to improve trade conditions and service. You can deal with them with confidence. As the leaders in their industry, with a wide scope of activity and absolute integrity, they are best equipped to assist the scrap generating or consuming firm in any general, specific or unique problem of profitable scrap recovery. Their specifications are the accepted standard throughout the world.

It pays - more - to go to the top!



METAL DEALERS DIVISION

Always look for this seal

NATIONAL ASSOCIATION
OF WASTE MATERIAL DEALERS

271 Madison Ave.

New York, N.Y.

For counsel on non-ferrous metal scrap, be sure to consult a NAWMD member dealer.

**JESSOP STEEL\*** 

HIGH QUALITY

## **GOOD SERVICE\***

\* High quality and good service are apt words to describe what you get when you buy tool and high-speed bar stock from Jessop Steel. Descriptive in the past—even more so today! For, during the last year, Jessop has greatly expanded its laboratory facilities for closer quality-control and radically adjusted its warehouse product-mix for faster service. Whether you buy bar stock, or any of the other products shown below, you'll find profit in sending your next order to Jessop Steel.

STAINLESS STEELS - HIGH SPEED STEELS - NON-MAGNETIC STEELS - HIGH SPEED TOOL BITS MEAT RESISTING STEELS - STAINLESS-CLAD PLATES - CARBON-AND ALLOY STEELS TOOL STEELS FOR SPECIAL PURPOSES - CAST-TO-SHAPE TOOL STEELS - HIGH SPEED AND ALLOY SAW STEELS - TEMPERED AND GROUND STRIP STEEL - COMPOSITE HIGH SPEED STEELS - STAINLESS AND HEAT RESISTING CASTINGS - COMPOSITE DIE STEEL SECTIONS - PRECISION GROUND FLAT STOCK - DIE STEELS — HOT AND COLD WORK

STEEL COMPANY - WASHINGTON, PA

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Jessop Steel of Canada Limited, Wallaceburg, Toronto Jessop Steel International Corp., Chrysler Building, New York, New York



### IN ADDITION TO HARSHAW **BORON TRIFLUORIDE** HYDROFLUORIC ACID anhydrous aqueous

Here are many more productioncontrolled, high-quality fluorides:

Ammonium Bifluoride Ammonium Fluoborate Antimony Trifluoride Sublimed Barium Fluoride Bismuth Fluoride **Boron Trifluoride** Boron Trifluoride Complexes Chromium Fluoride Copper Fluoborate Fluoboric Acid Fluorine Cells Fluorinating Agents **Frosting Mixtures** Hydrofluoric Acid Anhydrous

Hydrofluoric Acid Aqueous Hydrofluosilicic Acid Lead Fluoborate Metallic Fluoborates Potassium Bifluoride Potassium Chromium Fluoride Potassium Fluoborate Potassium Fluoride Potassium Titanium Fluoride Silico Fluorides Sodium Fluoborate Tin Fluoborate Zinc Fluoborate Zinc Fluoride

#### THE HARSHAW CHEMICAL CO.

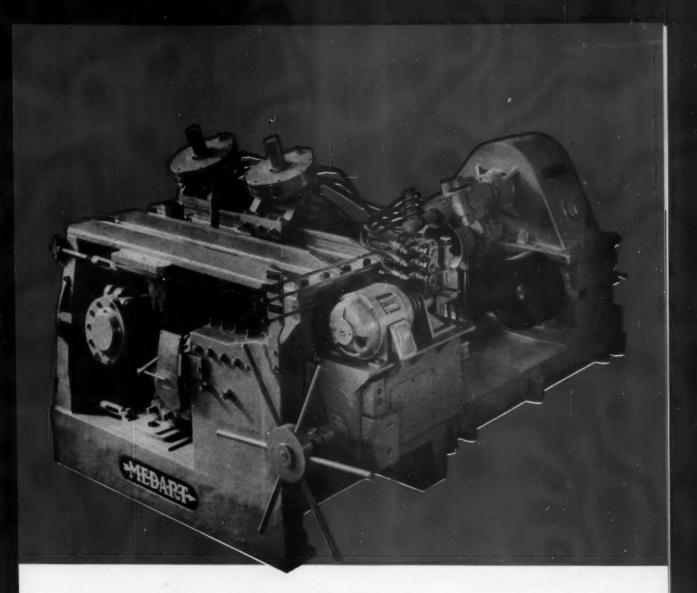
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#### WRITE FOR Harshaw's 40-page Boo







#### **BLAW-KNOX MEDART** makes what it takes

#### for continuous, high speed straightening, sizing and polishing

You can meet the most rigid requirements for cold finishing round bars, pipes and tubes with a Blaw-Knox Medart 2-roll Rotary Straightener. Designed to perform with the greatest accuracy, it straightens, "super-finishes," and corrects out-of-roundness in one operation.

Processing begins the instant the workpiece enters the rolls and continues right up to the very end. Because of this you can straighten short lengths as well as longer standard mill lengths. A modified straight roll then deflects the workpiece into the concave roll giving it a tremendous number of straightening cycles per foot, assuring precision straightening and sizing.

And this highly accurate finishing can be delivered at throughput speeds up to 350 ft/min. Operation is continuous by means of end-to-end feeding. The drive motor can be

reversed with the bar between rolls to permit additional passes for sizing and polishing.

The speed, versatility, and accuracy of Blaw-Knox Medart 2-roll Rotary's have made them the standard of the industry. Available in ten sizes, they can handle workpieces from ½" to 9" diameter. Contact us for detailed information, technical assistance or service.



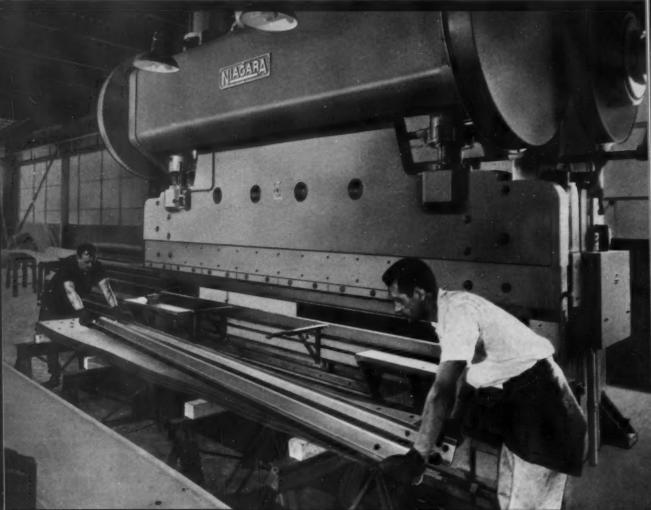
#### BLAW-KNOX COMPANY

Foundry and Mill Machinery Division

Blaw-Knox Building • 300 Sixth Avenue Pittsburgh 22, Pennsylvania







(Above) Forming highway guard rails from 12 gage steel on Niagara 520 Ton Press Brake.

(Right) Piercing rails with same machine.

(Far Right) Ferming chair seat frames for office furniture from 20 gage steel on Niagara 150 Ton Press Brake.

## Niagara for Press Brakes"

"The personnel of our organization has been acquainted with Niagara equipment for years. Niagara will stand behind any equipment furnished. Many millions of operations in the past 5 years on their presses and press brakes... equipment satisfactory from both the operational and safety standpoint. Our intention is to use the Niagara line entirely."

There in the words of one customer (a large Ohio metal fabricator whose press brake operations are illustrated), you have the sentiments of hundreds. Once experienced with any of the other metalworking machines which Niagara makes...presses, shears, bending rolls and dozens more...one just naturally thinks first of Niagara whenever the subject of press brakes comes up.

REASONS ARE MANIFOLD: (1) Extreme helpfulness of Niagara's engineers in selecting the machine and accessories that will do the job best (no other manufacturer can offer so complete and large a line of sheet and plate metalworking equipment). (2) Unrivaled reputation and experience in the field, dating back 77 years, that assure unquestioned reliability. (3) World-wide recognition for design leadership, combining rock-bottom operating economy and top-notch performance in *every* product it makes (take a moment to run down this partial list of imposing press brake features):

- Double end twin drive with double reduction gearing for smooth, uniform application of power at both ends of ram.
- Rugged, all-steel frames with box type crowns of unequaled strength and rigidity.
- Extra beavy, rigid bed and ram for maximum support of dies.
- Gearing totally enclosed in sealed oil baths for thorough, clean lubrication.
- Longer lasting, laminated, nonmetallic ways.
- · Powerful, smooth-acting, multiple disc clutch and brake,
- o Gibs maintain accurate, endwise alignment of ram.

Standardized in a complete line, ranging from 50 through 775-ton capacities, Niagara Press Brakes are built to produce a tremendous variety of work uniformly and accurately. Post yourself now on all the details by requesting Bulletin 89 D and, as soon as you can, avail yourself of some really worthwhile suggestions from a Niagara representative. Write.



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Distributors in principal U.S. cities and major foreign countries
America's most complete line of presses, press brakes, shears, other
machines and tools for plate and sheet metal work





### FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY



During the War for Independence, the iron industry expanded greatly because of the increased demand for cannons, cannon balls and other war materials. However, one of the most interesting and outstanding contributions towards the cause was a chain that stopped the British Navy from going up the Hudson River beyond the Fort at West Point.

In 1778, the Sterling Works, some 25 miles southwest of West Point, operated all their forges day and night to make a massive chain 1500 feet long. Each link was 2 feet long and weighed 100 pounds. This chain was carried to West Point, floated on logs and stretched across the Hudson, where it made a formidable barrier no British gun boat dared to cross.

BAKER'S MAGDOLITE, the original deadburned dolomite makes an important contribution to steel producers. MAGDOLITE offers you more uniform ingots, and better furnace efficiency at lower refractory costs. BAKER'S MAGDOLITE is always 5 ways better: Composition, Preparation, Strength, Economy and Quality, so the next time you order dead-burned dolomite, specify BAKER'S MAGDOLITE.

4-55

**ANOTHER FAMOUS FIRST** 

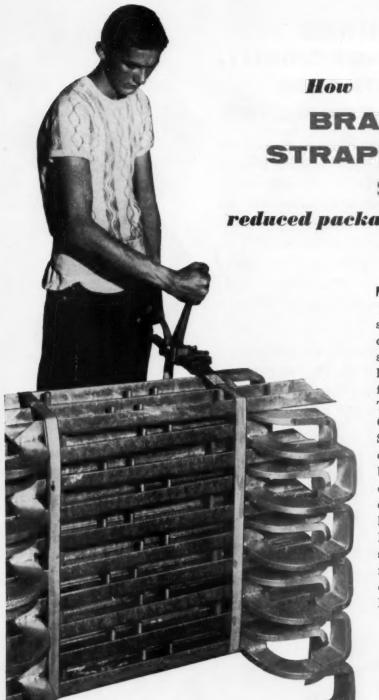


BAKER'S MAGDOLITE

The original dead-burned dolomite

#### THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA . PLANTS: BILLMEYER, YORK, PENNSYLVANIA . MILLERSVILLE, OHIO



#### BRAINARD STRAPPING SERVICE

reduced packaging costs by 90%

RANSFORMER hangers form-L erly crated for handling and shipment are now strapped into compact, easily handled units at a savings of up to 90% in costs of labor and materials. The savings followed a cooperative effort by Thiel Tool and Engineering Company, St. Louis, and a Brainard Strapping Expert. They're typical of steel strapping techniques being adopted by hundreds of companies to lower costs, increase efficiency and reduce shipping losses. Let a Brainard Strapping Expert point the way to similar savings for your company. You'll find him listed in your telephone directory. Or write direct to Brainard Steel.

> JACK N. GONZ, the Brainard Strapping Expert in St. Louis, helped Thiel Tool devise this money-saving application for steel strapping.



Brainard

STEEL DIVISION
SHARON STEEL CORPORATION

THE BRAINARD STEEL DIVISION

of the Sharon Steel Corporation
Dept. I-11, Griswold Street, Warren, Ohio
MAKERS OF QUALITY STEEL STRAPPING

## UNIQUE FEATURES IN SNYDER 9-SEGMENT, 24-STATION, IN-LINE AUTOMATED TRANSFER

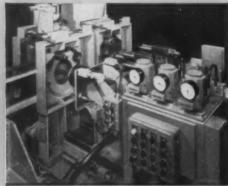
MACHINE for processing converter housings; independent control panels permit individual segment operation (co-ordinated with master panel); electric circuits can be individually checked by Circuit-Sleuth Panel; at Station 4, workpiece is re-oriented 90°; at Station 21, two dowel holes and one transmission hole are precision bored to .001 in size; at Station 22 these holes are automatically precision air gaged.

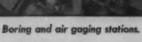
Workpiece reaches machine finish ground on both faces; machine performs 59 operations, delivers workpiece completed and automatically inspected. Production, 128 pieces an hour at 100% efficiency.



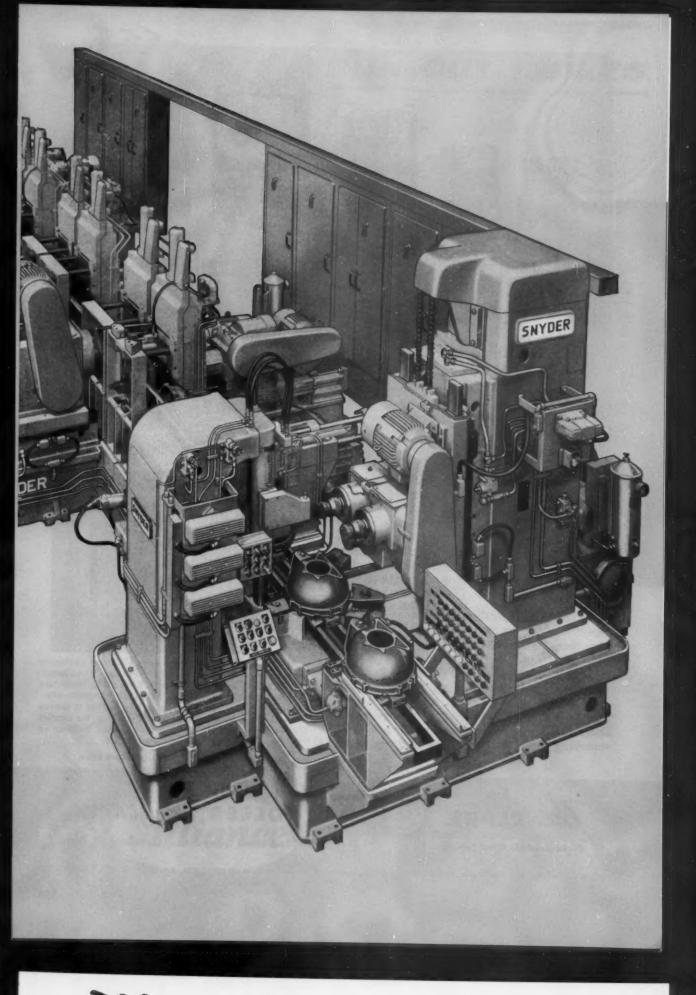
TOOL & ENGINEERING COMPANY
3400 E. LAFAYETTE • DETROIT 7, MICHIGAN

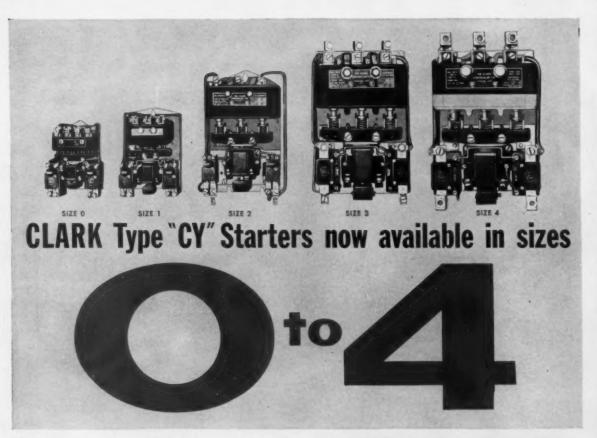
31 Years of Special Machine Tools with Automation





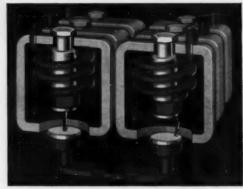






With the addition of the new size 4, the famous CLARK line of Type "CY" Magnetic Motor Starters now comprises the full range from 0 to 4. This means that Clark starters of the proven "CY" design incorporating vertical lift magnets are now available for more than 95% of industry's AC requirements. For installations requiring sizes 5 and larger, Clark will continue to supply dependable clappertype starters.

Clark Type "CY" starters have many outstanding design features for more dependable operation, less maintenance and longer life. For example—rugged construction with twin-break contacts means more trouble-free service... contacts can be inspected without tools... movable and stationary contacts can be removed and replaced quickly, coils changed and the entire magnet assembly removed—all from the front—without special tools and without removing the starter from the cabinet or panel.



Revolutionary arc-quenching principle is an exclusive feature of all Clark Type "CY" starters sizes 2 and larger. It combines twin-break contacts with strong multi-turn magnetic blowouts which force the arc to rotate—alternately lengthened and confined—so that it moves continuously from a hot to a cold spot on the contact surfaces. This practically eliminates metal build-up or pitting and greatly increases contact life.

For complete information contact your nearest Clark sales office or write us direct.





CONTROLLER

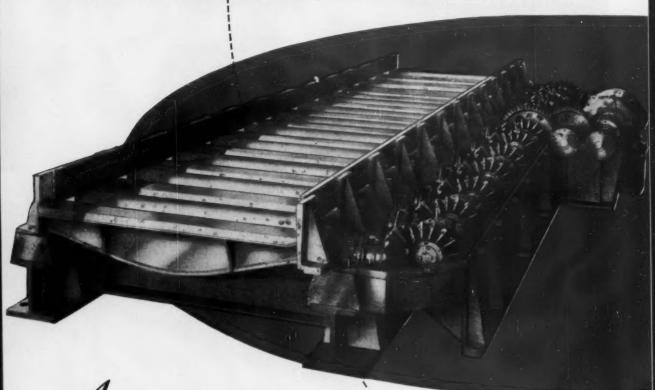
Company

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IN CANADA: CANADIAN CONTROLLERS, LIMITED . MAIN OFFICES AND PLANT, TORONTO

## Alliance RUN-OUT TABLES Designed\* to last...

THE LIFETIME OF YOUR MILL



liance run-out tables are built to last. One motor drives all rollers, turning them at the same speed. This reduces slippage and assures smooth handling of ingots, blooms and slabs. The gears (shown exposed) driving each roll are totally enclosed and run in oil. A sealed cover keeps lubricant in and dirt out.

Alliance designed and built this trouble-free runout table to operate efficiently for the lifetime of a mill. Depend upon Alliance to build the best.

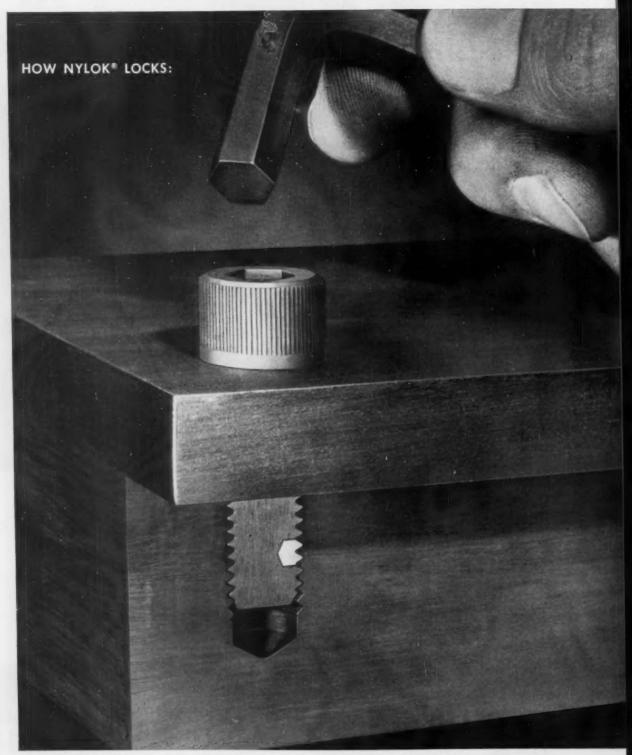
Send your heavy equipment requirements to "the world's largest builders of the world's largest cranes".



Uniform roller drive on the new Alliance run-out table moves steel more smoothly and keeps friction to a minimum, lengthening the table's service life.

THE Alliance MACHINE COMPANY

## NEW-self-locking UNBRAKO



LOCKED! The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together and locks the screw securely.

## socket head cap screws



Self-locking UNBRAKO socket head cap screw.



**BEFORE ASSEMBLY.** The nylon pellet projects slightly. When assembled, threads will be impressed into it.



AFTER REMOVAL. "Plastic memory" of pellet has expanded impressed threads to greater diameter than screw threads. Screw can be used repeatedly. In use, "memory" keeps threads tightly locked.

They won't work loose. And they simplify design and save production time.

UNBRAKO socket head cap screws are now available embodying the Nylok\* self-locking principle. Nylok provides the first truly practical solution to the problem of making cap screws self-locking.

An Unbrako cap screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the Unbrako into any tapped hole. Seated or not, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not work loose.

You save production time when you make products with self-locking Unbrakos. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. And in many cases you will save weight and mass by using shorter screws in tapped holes instead of drilling through and using nuts and lockwashers.

Self-locking Unbrakos are reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from -70° to 250°F. And, when screws are properly seated, the locking pellet also functions as a liquid seal.

A complete line of self-locking UNBRAKO socket screw products, in a wide range of standard sizes, materials and finishes, is available through your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 17, Pa.

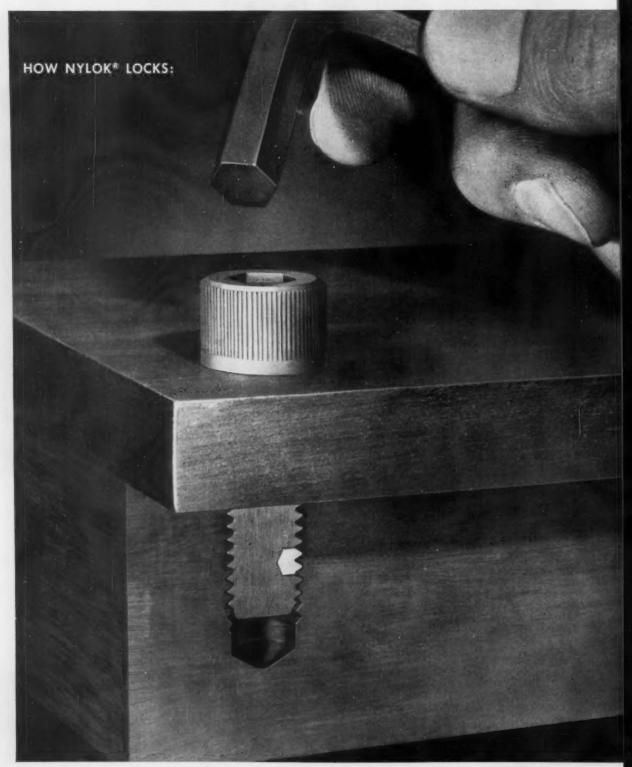
\*T.M. Reg. U.S. Pat. Off., The Nylok Corporation

UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.



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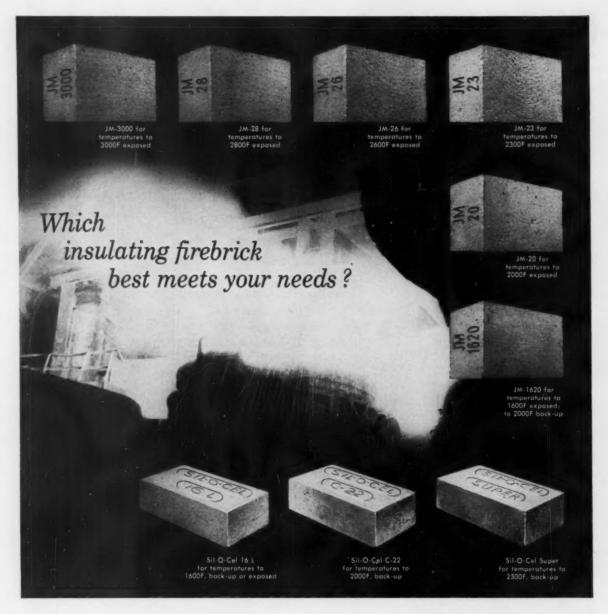
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\*T.M. Reg. U.S. Pat. Off., The Nylok Corporation

UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.





#### Only Johns-Manville's insulating brick family offers the right combination of properties . . . for furnace requirements to 3000F!

J-M's nine different insulating firebrick\* means you never have to settle for a brick that's nearly right! Instead, you choose the one brick that best meets your needs . . . for such important properties as temperature resistance, load-bearing

strength, conductivity and density.

Johns-Manville has two strategically located plants for the production of insulating brick: Lompoc, California, and Zelienople, Pennsylvania. Brick are available from the stocks of authorized Johns-Manville distributors in key industrial areas.

For complete information, call your nearest J-M representative. Or write for brochure IN-115A to Johns-Manville, Box 14, New York 16, New York. In Canada, Port Credit, Ontario.

\*Sil-O-Cel® Super and C-22 insulating brick are for back-up use only



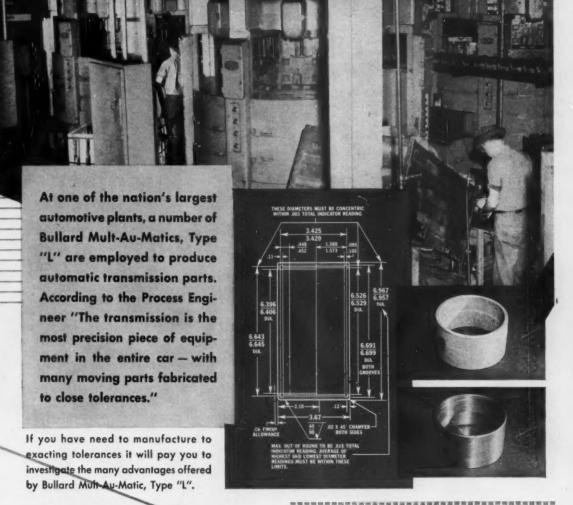
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#### STAINLESS STEEL

1/2" O.D. TO











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## Offers Your Most Complete Source of Supply

You can find a tube to fit any requirement in Republic's full quality line of welded steel tubing.

Manufactured at the Steel and Tubes Division, Republic Tubing is welded by the ELECTRUNITE Process . . . a Continuous Electric Weld method that unites the wall under pressure without the addition of foreign or extra metal. Among other advantages this process assures uniformity of wall thickness, strength, ductility, concentricity, diameter and physical and mechanical properties.

Republic, the pioneer in this improved welding technique, is proud of its many "firsts" in the industry. In addition to introducing ELECTRUNITE® Boiler Tubes to the trade more than 25 years ago—plus Electrical Metallic Tubing and Dekoron®-Coated E. M.T. to the electrical industry, Republic

was the first to provide a non-destructive electronic production method of testing tubing used for critical pressure applications, known to the trade as FARROWTEST®.

With plants in four locations, we are able to service you promptly with these complete ranges of analyses of carbon and stainless steels for mechanical, structural and pressure uses. A wide selection of sizes for every tube is also available. (See captions.)

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World's Widest Range of Standard Steels

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PRESSURE SPECIAL BRIGHT AN-NEALED—Up to 4"O.D.—Spe-cial Striny Surface MECHANICAL

FULL FINISHED-Annealed and Tested for All Mechanical

MECHANICAL

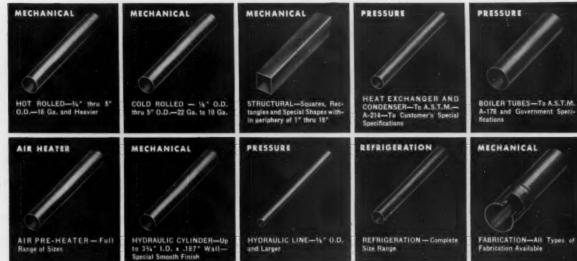
ORNAMENTAL—Type 302 — Not Annealed — Not Preseure Tested

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STAINLESS CLAD - Double

#### STEEL TUBING CARBON

1/4" O.D. THROUGH 5" O.D.



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DEKORON-COATED RIGID STEEL CONDUIT - Plastic Armored Conduit-1/2" thru 6"

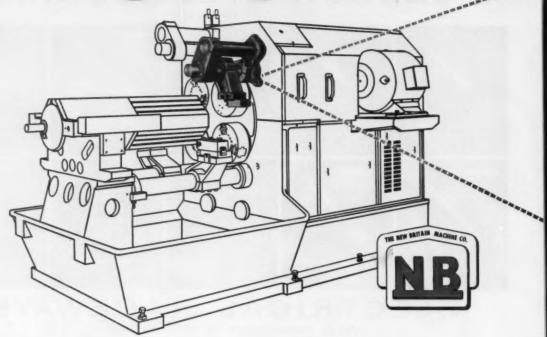
## STEEL

and Steel Products

#### REPUBLIC STEEL CORPORATION STEEL AND TUBES DIVISION Dept. C-2370 216 East 131st Street, Cleveland 8, Ohio Please send me information on: ☐ Stainless Steel Tubing and Pipe — Type\_ ☐ Carbon Steel Tubing — Type\_ Electrical Raceways - Electrical Metallic Tubing ☐ Rigid Steel Conduit Dekoron-Coated E. M. T. Name. Company\_ Address\_ City\_ Zone\_\_State\_

## Only **New Britain** Chuckers offer the EXTRA advantages of

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Independent swinging type arms have the PLUS advantage of *longitudinal* action. The combination of radial and longitudinal motion permits a variety of operations which often makes the difference between a single machining and the need for secondary operations.

Arms are positionable horizontally for any length of work, and each is operated independently through separate cams. Bearing surfaces are located away from wear-producing grit and grime. Together with New Britain open-end construction, swinging arms afford wide-open accessibility and more chip room.

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The New Britain Machine Company — New Britain, Connecticut



## Youngstown Sheets and Strip are Quality Controlled to help Control your Product's Quality



When you specify Youngstown Cold Rolled Sheets and Strip you get a product of uniform high quality. Tested and inspected at every step in Youngstown's fullyintegrated operations, they are held to rigid high standards of ductility, tensile strength, flatness and surface finish - which guarantees you an almost continuous production of even the most difficult-to-form parts. This makes for increased profits, greater production, lowered costs and an improvement in over-all product quality.

For additional information or metallurgical assistance, call or write your nearest Youngstown District Sales Office—or write direct to our Home Office.

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SHEETS
AND STRIP

Photo courtesy Hydraulic Press Mfg. Co.

## Louis estour

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44 years of cutting tool experience are behind him ... ready to serve your needs.

Broach design can make or break a broaching operation! Your Illinois Tool Works sales engineer has the experience and engineering skill to help you determine the proper approach to broaching problems . . . to aid you in planning broach specifications, broach design. Illinois Tool Works has been a leader for almost half a century in the design and production of metal cutting equipment for almost every metal cutting application. Talk to your Illinois Tool Works man about economies that you might gain through the performance of superior broaches.

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Look to your Illinite Distributor for the most complete line of standard end mills, standard milling cutters and special cutters. Pulpit type power unit provides full visibility, easy accessibility.

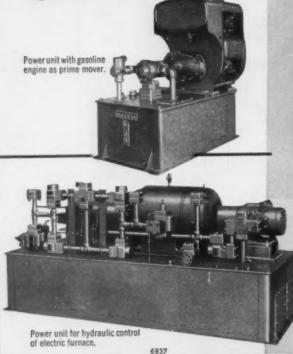




Compact power unit showing gasket-mounted valves.



Portable power unit for testing pumps.



**Individually Designed** to Meet SPECIFIC Needs

ICKERS. Custom Built

DEPENDABLE PERFORMANCE IMPROVE AND SIMPLIFY DESIGN REDUCE INSTALLATION COST AND TIME EASIER SERVICING BETTER APPEARANCE

Vickers engineers approach the design of a custombuilt hydraulic power unit from the standpoint of the customer's INDIVIDUAL needs. The sole objeclive is to meet HIS requirements with the best hydraulic "package". This assures the most compact, efficient and convenient hydraulic equipment for the particular machine.

A Vickers Hydraulic Power Unit includes all necessary pumps, valves, intermediate piping, oil reservoir, motors, controls, etc., as well as all hydraulic accessories (oil filters, air cleaners, oil level gauges, fittings, etc.). Hydraulic connections can be grouped in a convenient manifold.

In addition to the advantages mentioned above, each Unit is pretested at the factory and ready for immediate operation. Vickers undivided responsibility for the entire hydraulic control system is also an important feature to both the machine builder and his customer. Write for Bulletin 52-45.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

## new ideas in COLD DRAW equipment



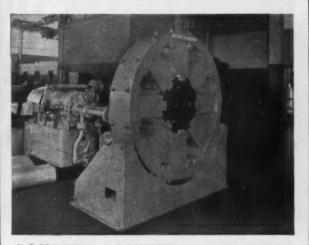
#### BULL BLOCK

Used for drawing long lengths of small diameter, thin wall copper tubing. Finished tube sizes—¼" O.D. to ¾" O.D. Speeds up to 2000 f.p.m. Block diameters—10" to 60"; Block lengths—24" to 72". Pulling capacities—1000 to 20,000 lbs. Inverted or Horizontal types.



#### BAR BENCH

Continuous flow material line from Bench to Shear to Straightener. Used for single, double or triple draw—rounds, squares, hexagons, flats, shapes in ferrous or non-ferrous (mild steel, stainless and alloys). Pulling capacity 25,000 to 100,000 lbs. Draw lengths 20 to 60 ft. lg. Choice of arms. Used with or without push pointers.



#### SQUEEZE POINTER

New hydraulic power unit. Simplified design, oil-tight, electric timers. Used for pointing copper, brass, and aluminum tubes, sizes 3" O.D. to 13" O.D. Automatic and manual control. Stroke adjustment for various point sizes. Production—Approximately 150 points per hour on 3" O.D. Copper Tube pointed to 1½" dia.

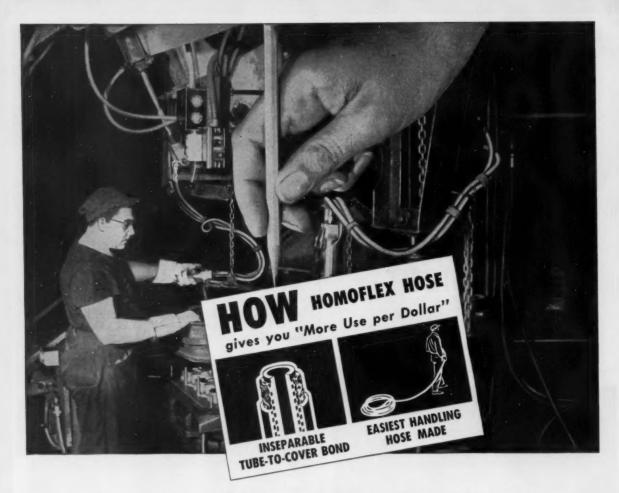
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THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA.

PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

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#### This Rugged Hose Handles Like a Rope!

Strong enough to stand up under the toughest job conditions, Homoflex Hose is light in weight and as flexible as a rope. It's the easiest handling hose made for use with air, water, and other fluids and gases! The exclusive Homoflex construction increases hose life, too . . . assuring you "More Use per Dollar" for every length you buy.

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Ask your R/M representative about easy handling Homoflex Hose for your operations. He'll also tell you how other types of R/M Hose for general and special purposes do a better job, longer . . . give you "More Use per Dollar".

MANHATTAN RUBBER DIVISION - PASSAIC, NEW

















Other R/M products include: Industrial Rubber . Fan Belts . Radiator Hose . Brake Linings . Brake Blocks . Clutch Facings Asbestos Textiles \* Packings \* Engineered Plastic, and Sintered Metal Products \* Laundry Pads and Covers \* Bowling Ball

RAYBESTOS-MANHATTAN,

#### Electroforming these copper boot molds is easier with



A COPPER MOLD and one of the U. S. Rubber Co. Gaytees produced in it. Mold thicknesses vary from .035" to .090", depending on size and type of boot.



EACH ELECTROFORMING TANK can plate 10 molds—uses standard acid-plating solution and 33 "Plus-4" rolled anodes, 1/2" x 8" x 20"-300 amps power input.

### ANACONDA "Plus-4" Anodes

In electroforming—as in electroplating and electrotyping - Anaconda "Plus-4" (Phosphorized Copper) Anodes are turning in superior performance records.

The Shoe Hardware Div. of United States Rubber Company electroforms the copper molds used in the production of rubber and plastic rainwear known as Gaytees®. With ordinary anodes they had been troubled with porosity and treeing.

Nearly two years ago, they turned to "Plus-4" Anodes and report the following advantages:

- 1. Extremely smooth plating, without "tree-
- 2. Good grain build-up.
- 3. No porosity.
- 4. Uniform anode corrosion with consequent scrap reduction.
- 5. Savings in solution correction due to reduction of sludge and copper build-up.
- 6. All-round cleaner plate.

You have everything to gain and nothing to lose by setting up one acid-copper-plating tank to test "Plus-4" Anodes. See for yourself how they can save you money and time-help you make an improved product. Send in the coupon today.

### "Plus-4" Anodes

(Phosphorized Copper)

A product of

made by The American Brass Company

The American Brass Co., Waterbury 20, Conn. Anaconda American Brass Ltd., New Toronto, Ont. Give me details on how I can get a test quantity of "Plus-4" Anodes sufficient to supply one tank. CITY.....ZONE...STATE.....

# An important NEW bulletin

## for every Structural Shop

An Advanced Wall Radial Drill for use in Structural Steel Fabrication

The THOMAS Wall Radial is a column mounted drill arranged for vertical travel on the column and with radial coverage provided by the double hinged radial arm. Variable spindle speeds are previded and spindle teed is presumatically powered.

GENERAL SPECIFICATIONS

CAPACITY - 19 to 2 Cap, drift at the SPHIDLE SPEEDS - 128-207-276-A16-1878
VERTICAL TRAVEL ON COLUMN - 05
VERTICAL TRAVEL ON COLUMN - 05
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SPINDLE BEARINGS - Ann. Incident Column - 05
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SPINDLE FEED - Promoted Column - 05
SPINDLE FEED - Promoted Column - 05
SPINDLE LOCKS - Promoted Column - 05
SPINDLE COLUMN - 05
SPINDLE COLUMN - 05
SPINDLE COLUMN - 05
SPINDLE MOTOR - 5
SP

It's a bulletin you'll want to read . . . because the Thomas Wall Radial Drill is a "must" in every shop that depends upon production drilling. Its ready utility and extreme flexibility make it the handiest drilling tool you've ever used. Strong and sturdily built—like all Thomas machines—the Thomas Wall Radial Drill will meet every drilling need of structural and bridge fabricators.

Send for your copy of Bulletin 320 now!

Thomas Machine Mfg. Co., Pittsburgh 23, Pa.
Please send us your Bulletin 320.

Company\_\_\_\_

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THOMAS

MACHINE MANUFACTURING CO.

PITTSBURGH 23, PA.



## SIMONDS SPECIAL PARTS DIVISION

#### can make them for you

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Simonds Special Parts Division offers you a complete service—from steel of any desired analysis made in our Steel Mill in Lockport, N. Y., to fabrication in our famous Controlled Conditions Plant in Fitchburg, Mass.

Simonds Special Parts Division is fully equipped to produce precision ground, heat treated flat steel parts in any quantity for aircraft engines, printing presses, slitting machines, air compressors and numerous other applications. Clutch, valve and engine discs, spacer rings, slide bars, washers and die plates are other Special Parts Division items. Send inquiries, with full specifications or blueprints, to your

nearest Simonds Factory Branch.



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(for cutting or scraping)

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of cutting

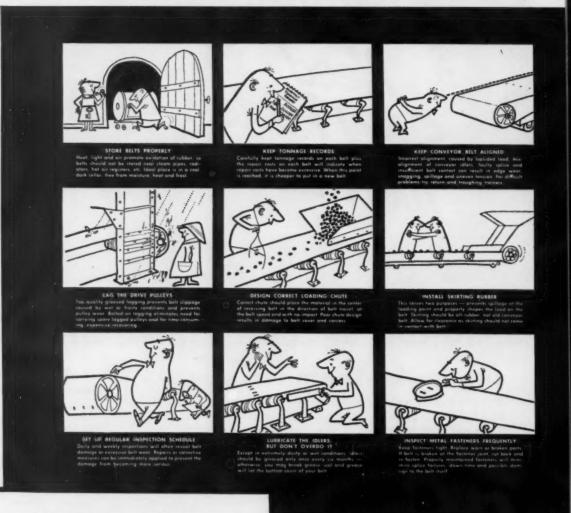
Irregular Shaped Cutters — all types

Heat Treated Liner Plates Rectangular Plates — all types



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Free Wall Chart gives



#### INDUSTRIAL DIVISIONS PRODUCTS

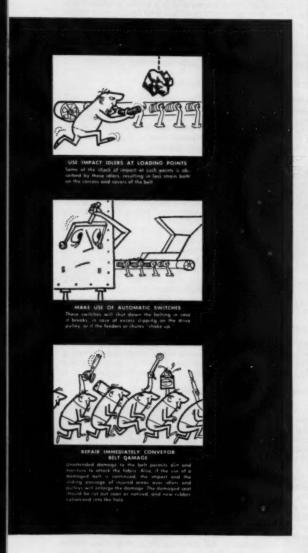
CONVEYOR BELTING - CONVEYOR MACHINERY
INDUSTRIAL HOSE - VIBRATING CONVEYORS
VIBRATING SCREENS - DESIGN, MANUFACTURE,
ENGINEERING AND ERECTION OF
COMPLETE BULK MATERIALS HANDLING SYSTEMS
"GLIDE RIDE" THE NEW MOVING SIDEWALK

This wall chart, 23" x 33" in two colors, has many valuable tips that will enable you to increase the life of your conveyor belting. To obtain a copy, contact



## **CONVEYOR BELTING**

### the answers



your local HR Industrial Supply Distributor or write to our executive offices in Stamford, Connecticut.

#### -ROBINS

#### Which is the best belt for you?

For Mining (Metallic and Nonmetallic)

Maltese Cross for especially severe service. Ajax for general heavy duty service, and Conservo for general light duty service. Exceptionally severe special conditions may require use of specially designed Hewitt-Robins belts such as Shock Pad, CR-50 and CR-70, Raynile and Super-Raynile, Ajax Underground and Monarch Neoprene fire-resistant belting.

#### For Metal Processing

Maltese Cross for exceptionally severe service. Ajax for general heavy duty service, and Monarch Neoprene for oily service. Maltese Cross Fiberglas Hot Material, Maltese Cross Fabric-type Hot Material and Hewitt Hot Service are especially designed for hot material handling.

#### For Public Utilities

Monarch Neoprene for oily service, Maltese Cross Hot Material and Hewitt Hot Service for hot material handling. Maltese Cross for especially severe service and Ajax for general heavy duty service.

#### For Food Processing

Canners and Packers and Hewlite for food handling, Monarch Neoprene for oily service, Ajax Rufftop, Conservo Rufftop and Conservo Transport for package handling. Monarch, Ajax and Conservo for grain and feed handling.

#### For Materials Handling

Conservo for portable conveyors. Ajax Rufftop, Conservo Rufftop, Conservo Transport and Hewlite for packaging conveyors.

#### For Chemical Processing (Including Pulp and Paper)

Maltese Cross for exceptionally severe service, Ajax for general heavy duty service, and Conservo for general light duty. Maltese Cross Fiberglas Hot Material, Maltese Cross Fabrictype Hot Material and Hewitt Hot Service are especially designed for hot material handling.

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ONE OF A SERIES ...

What makes a cylindrical roller bearing good?

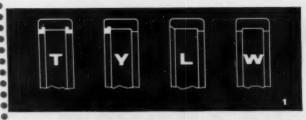
WELL-MADE, VERSATILE OUTER RACES

Outer races are vital parts of all roller bearings, except where housings can provide hardened and ground operating surfaces. In housings of aluminum, cast iron or un-heat-treated steel, outer races assure a dependable roller pathway.

While the outer race is not normally the critical member of the bearing, it can still suffer fatigue failure, like all objects subjected to stress repetitions. Therefore HYATT outer races are manufactured with the same scrupulous care that we apply to inner races and all other components of HYATT Bearings. We supply a wide variety of outer races, which makes HYATTS versatile enough to fit practically any design requirements. Some of these application and operating advantages are briefly covered at the right.

You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your needs. Remember, HYATT is America's first and foremost maker of roller bearings. Hyatt Bearings Division of General Motors, Harrison, New Jersey.





#### I. OUTER RACE TYPES

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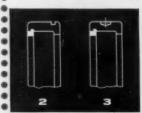
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HYATT Hy-Load outer races are available in a variety of standard configurations (Figure 1). W, L and Y races have solid flanges, which sustain light or intermittent thrust loads. T and Y races with internal snap rings have equal radial load-carrying capacity but are not recommended for applications under continuous thrust. T, Y, L and W races may all be mounted using roller ends against the solid shoulder or internal snap ring for purposes of locating the outer race axially.

#### 2. CIRCUMFERENTIAL LOCATION

An ample choice of outer race locating methods may be used with HYATT Hy-Loads. Circumferential location is often by a press fit. (Generally the rotating race should be applied with a press fit and the stationary race with a push fit.) When a push fit is used, axial clamping against the race ends provides satisfactory circumferential location. Positive circumferential location is provided by an outer race dowel.



#### S. AXIAL LOCATION

Axial location of an outer race is usually by pressing or pushing the race to a housing shoulder. The race may be prevented from "walking out" of the housing bore by the flange or snap ring operating against the roller ends. Axial clamping against a housing shoulder or snap ring provides positive axial location. However, if a shoulder is not available in the housing, an auxiliary holding

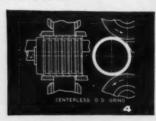
device such as an external snap ring or an outer race dowel is needed. HYATT Hy-Load Bearings can be supplied to original equipment builders with outer races having a snap ring groove (Figure 2) or a blind dowel hole (Figure 3), at moderate increase in cost.

#### 4. OPERATIONAL REQUIREMENTS

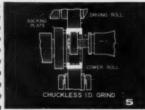
Quality controls are rigidly applied to all HYATT outer races to maintain:
a. Minimum wall variation; b. minimum runout of race ends to bore; c.
minimum runout of race flange inner faces to bore; d. minimum pathway
and outer diameter taper; e. minimum outer diameter tolerance.

#### 5. MANUFACTURING PROCEDURES

After careful primary machining and heat treating, ends are faced off square and parallel by a double end grind. This provides a reference surface from which all runouts and squareness can be gaged. Outer race diameters are generated by the centerless grinding method to provide an O.D. with as little out-of-round as practical. The through-feed method is a



valuable economy (Figure 4). Next, the pathway (or race I.D.) is ground centerless, generating a cylinder concentric with the O.D. cylinder, by driving the race on the O.D. and positioning the grinding wheel relative to the drive roll (Figure 5). Finally, flanges are ground using the race ends as a reference. The result is a race of as nearly perfect geometry as is practical (Figure 6). Critical final inspection completes the procedures.







#### PROVED THROUGHOUT INDUSTRY

Industrial leaders all over the world have used Rust-Oleum to stop and prevent rust for over thirty years. Rust-Oleum can do the same for your tanks, stacks, pipes, machinery, metal sash, wire fences, girders, etc.

#### RUST-OLEUM IS EXCLUSIVE

Rust-Oleum uses a speciallyprocessed fish oil vehicle that penetrates rust to bare metal, dries right, and is free from objectionable odor. Accept no substitutes. Buy—and specify Rust-Oleum. You'll be happy that you did. There is only one Rust-Oleum—it is distinctive as your own fingerprint.





#### APPLY DIRECTLY OVER RUSTED SURFACES

Just scrape and wirebrush to remove rust scale and loose rust—then brush Rust-Oleum 769 Damp-Proof Red Primer right over the remaining rust, usually eliminating costly surface preparations. Then—follow-up with your desired Rust-Oleum finish color.



#### MANY COLORS, INCLUDING ALUMINUM AND WHITE

You beautify as you protect, because Rust-Oleum finish coatings are available in practically all colors, including aluminum and white. They use the same basic rust-inhibiting vehicle as Rust-Oleum 769 Damp-Proof Red Primer and so provide double protection.

#### GREATER COVERAGE—

Rust-Oleum is so easy to apply by brush or spray that one man can often do

that one man can often do
the work of two. Because of
Rust-Oleum's easy-flowing
qualities, an average of 30%
more coverage is usually received—depending upon
the type and porosity of the
surface.





#### PRACTICAL ANSWER TO YOUR RUST-PRODUCING CONDITIONS

Rust-Oleum dries to a firm, decorative finish that resists salt water, heat, fumes, sun, steam, humidity, and weathering. Whatever your rust problem—you'll find Rust-Oleum the modern, practical way to stop rust.

## Facts

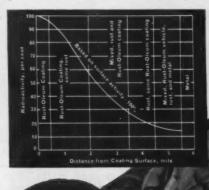
prove the economy of

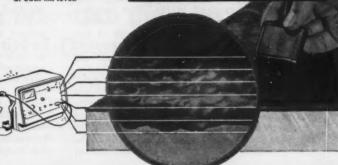
## RUST-OLEUM.

Geiger Counter traces Rust-Oleum penetration through rust to bare metal. The results of radioactive research prove that Rust-Oleum penetrates rust to bare metal. Rust-Oleum's specially-processed fish oil vehicle was radioactivated and formulated into Rust-Oleum 769 Damp-Proof Red Primer—then applied to rusted test panels. Geiger Counters then traced Rust-Oleum's specially-processed fish oil vehicle through the rust to bare metal. This penetration enables Rust-Oleum to be applied directly over sound rusted surfaces—usually eliminating costly surface preparations. Attach coupon to your business letterhead for your

thirty-page report,
"The Development of a
Method To Determine
The Degree of Penetration of a Rust-Oleum
Fish-Oil-Based Coating Into Rust On Steel
Specimens," prepared
by Battelle Memorial
Institute technologists.

Curved chart line shows Geiger Counter recordings of Rust-Oleum penetration at each mil level.





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Rust-Oleum Corporation 2562 Oakton St., Evanston, Illinois



Complete literature with color charts.
 Thirty-page report on Rust-Oleum penetration.

■ Nearest source of supply.



Approximately 200 Diesel Freight Locomotive units are serviced at the large, modern shop of the Southern Pacific Railway, Roseville, California. Playing an important part in this operation is the Cleveland Tramrail overhead crane system which provides handling service for the entire plant.

There are two 5-ton 62'-10" long cranes operating in two bays, each of which has four crane runway tracks. The tracks are not spaced equally but are arranged to fit between air ducts and ventilating equipment in the ceiling to obtain maximum crane lift. The use of Tramrail multirunway cranes made possible the construction

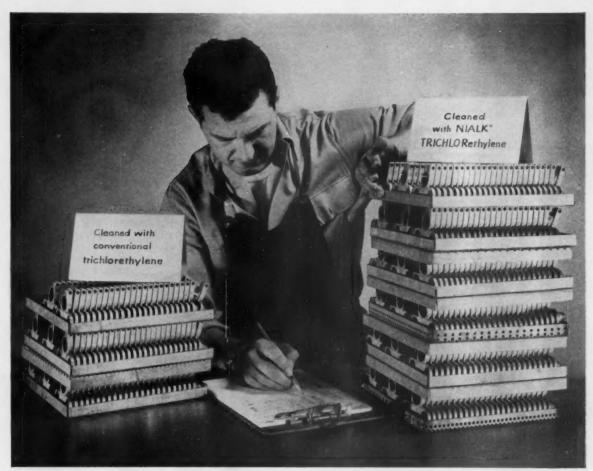
of a lower height building than would have been required with top-running type cranes.

The crames are powered by tractor units attached to each crane truck. These powerful drives provide smooth acceleration and are easy to remove and maintain. The cranes are floor operated and push-button controlled. The ease with which parts are spotted into exact position makes the crane a tremendous asset when overhauling locomotives.

This shop is the service center for an area extending from Portland, Oregon, to Fresno, California, and from the Pacific to Sparks, Nevada. It is in operation 24 hours a day, 7 days a week.







Operator using NIALK TRICHLO Rethylene cleans more parts, because NIALK has psp which prevents acid contamination, reduces number of cleanouts.

## Why you get more effective degreasing when you use Nialk® TRICHLORethylene with PSP

There's a difference—a big, cost-cutting difference—between NALK TRI-CHLORethylene and conventional vapor-degreasing solvents.

Light, heat, air, acids, and active metals such as aluminum, given time, can break down improperly stabilized trichlorethylene, making it unfit for further degreasing.

#### Only Nialk TRICHLORethylene has psp

The stabilizer in NIALK TRICHLORethylene has **psp**—permanent staying power. It's neutral, non-alkaline. You never have to replenish it.

Only NIALK has this permanent staying power. Even after repeated distillations, its unique stabilizer prevents acid formation and other causes of breakdown. NIALK works equally well with all metals.

#### psp means cheaper degreasing...here's why

You don't have to clean out your degreaser nearly so often with NIALK TRICHLORethylene. You can degrease many more parts between cleanouts.

The NIALK stabilizer actively retards formation of degradation products in your degreaser—cleanouts are easier, faster.

#### Get proof of Nialk's cheaper, safer degreasing

See for yourself how NIALK TRI-CHLORethylene with **psp** stays stable, keeps cleaning efficiently long after other solvents have lost their punch. Write on your business letterhead for a revealing resumé of comparative metallurgical tests on the five leading brands.



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November 8, 1956

51





Machining time, such as planing, rough cutting, milling, hand benching and burring are appreciably reduced on Finkl SMQ Die Blocks. Thorough field testing shows that the Special Machining characteristic of SMQ saves shop time and gets the die into production sooner.

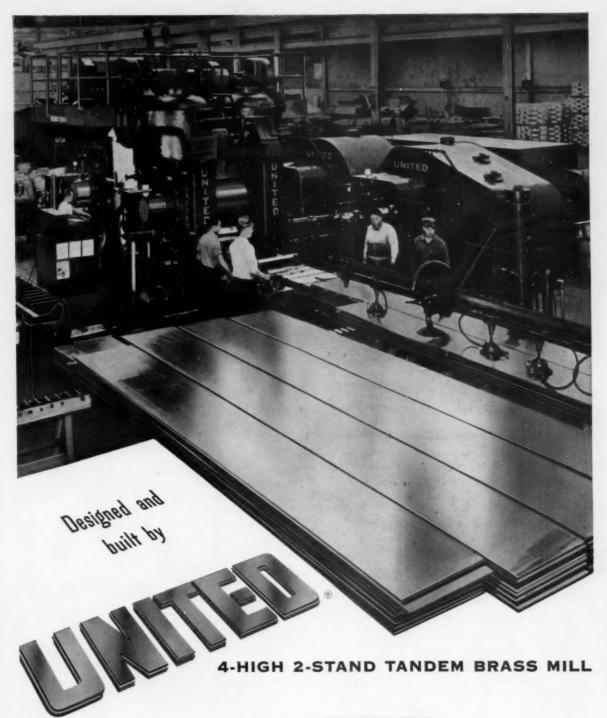
There is a Finkl steel available for any forging need. All are quality controlled through each step from our own melt shop to final inspection.

When you next consider die blocks, your local Finkl representative will gladly help you plan for "impressions that last."

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The booklets shown above are only a few of many available from Ryerson. In all, there are scores—covering almost every type of steel and steel product, and many allied products as well. The information they contain has helped to improve products, speed production and increase profits—hundreds of steel users tell us so.

Any or all of these bulletins are yours for the asking. Just check the ones you want in the list at the right. Mention any other information you'd like to have, and send with your name and address to your nearby Ryerson plant, or to Box 8000-A, Chicago 80.

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#### THE IRON AGE

#### NEWSFRONT

#### **Continuous Casting Considered For South**

Nothing's decided yet. But a Southern steel mill is taking a serious look at the continuous casting process, with an eye towards adoption. The mill is approaching the point where modernization of blooming facilities is due; leans at the moment toward the continuous method. Final answer may come in December.

#### **FRB Index Pushes Toward Record**

Look for the Federal Reserve Board's Index of Industrial Production to nuzzle very close to 150 this year, for an all-time record. At the same time, Gross National Product will hit a \$418-billion annual rate. For comparison, FRB Index hit 144 in September this year, equal to previous peak. GNP for third quarter was at a record \$413-billion rate.

#### Wanted: More For The Whirlybird Buck

Army is seeking more versatile helicopters. Design competition starts next year on a light observation type craft with about one-third the price tag of present models. Army wants it by 1959 or 1960. With large "flying crane" design 'copters already under study, proposals for a new medium cargo craft of 3-ton capacity are now being considered.

#### Coal-Off The Ropes And Swinging

Coal's comeback is gaining momentum. Coal industry now figures production will hit 500 million tons this year—highest in five years. In 1957, production should be up another four to five pct—and mining economists believe growth will continue. To meet future demand new mines will have to be opened, and \$1 billion raised over the next 10 years to finance the necessary expansion.

#### Read "Yes, But-" Into Red Tooling Reports

Read Russian reports of high-speed machining warily, one carbide maker advises. Translations from Red technical journals speak of cutting at 7500 sfpm with ceramic tools, experiments at 12,000 sfpm. But applications at such speeds are highly restricted. Necessity for near-perfect balance to prevent vibration automatically eliminates most workpieces, restricts most work to finish turning.

#### Castings: Salt Bath Plays Dual Role

Gray iron castings are freed of external sand, internal stresses simultaneously by one midwestern founder. Two-in-one operation means time and money savings. Procedure now has small castings moving directly from shakeout screen to racks; thence (automatically) through molten sodium hydride salt bath held at 800°F. This scours sand, stress-relieves batched castings fast.

#### **Army Finds Better Pretreatment Coating**

A new, one-package pretreatment coating for steel, aluminum and magnesium has been developed under Army sponsorship. The wash primer, Formula XP-7, offers several advantages. Among these: It packages in an ordinary phenolic- or expoxy-coated can; requires no special mixing at point of application; can be brushed on, dipped or sprayed.

#### Computers: Shortcut To Machining Answers

Machinability computers are proving themselves on a variety of shop problems. One plant, following computer findings, reduced speed in turning axle shafts from 770 to 425 fpm, to step up carbide tool life from former 4½ to 45 minutes. Besides determining proper speeds, feeds, computers are helping in setting time standards, in training, in cost estimates, in determining machine tool needs.

#### Who's For Plastic Sports Cars?

Plastic-body sports cars appear slated for a major selling push. Two automakers are running full-scale tests on plastic-body cars. GM is reported putting even stronger emphasis on the sports-car qualities of the original, plastic-bodied Corvette design; will attempt to combine the same or lower selling prices with increased performance to spur buyer interest.

# Helping to overcome metal fabricating difficulties, improving products

RESTRICTED
SPECIFICATION
COLD ROLLED
STRIP STEEL

Processed to meet special gauge tolerances and provide special finishes and physical properties . . . solves many fabrication, cost & performance problems.

Helping to overcome metal fabricating difficulties, improving products without skyrocketing costs or just getting costs down are usual events with CMP.

For example, the manufacturer who was heat-treating formed steel parts subsequently assembled with other components into a powered unit. The forming involves severe deformation and was hampered by lack of uniformity in the annealed strip steel. Distortion in the heat treatment followed, resulting in a low percentage of finished assemblies passed as satisfactory.

To minimize these fabricating difficulties, CMP developed a special annealing process for the strip. Using this steel, parts, when subjected to the manufacturer's standard heat-treating practice, were acceptable and yield was greatly increased.

At CMP, processing cold rolled strip steel to restricted specifications has been reduced to an exact science and CMP men have been trained to spot opportunities for solution of production cost and product improvement problems through application of restricted specifications.

Why not put your problems up to a CMP man?



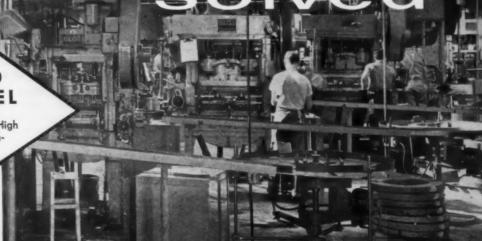
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No. 5 of a Series



#### Ten Commandments Of Industrial Health

There is nothing wrong with success, but it's possible to succeed without ruining your health . . . Three out of four businessmen are below parbecause they don't take time to be healthy—By Harry J. Johnson.

♦ THE HUMAN urge to better oneself is an admirable trait. I'm all for it. And I've learned enough about psychology to know that what I have to say is not going to stifle that urge or still the determination of even one reader to succeed in his work. I wouldn't want to.

But as a physician interested in preventive medicine I must raise the red flag of warning! To succeed is one thing; but to ruin your health in the process is another.

I know it's stretching a point, but I can't help repeating a story told me by an old friend. It seems that as they were laying a well-to-do businessman to rest, one of the mourners remarked to another how sad it was that good old George had to go to such an early grave. "Yes, it is too bad," said the other, "but how many of us can be as successful as George was."

The tragedy of it is that it's possible to keep your health and to succeed, too. There are too many living examples of that statement to leave room for much argument.

Yet three out of every four businessmen today are living 25 to 50 pct below maximum efficiency. Few really have any serious organic disease.

Here are a few pointers:

#### 1) Enjoy Your Work!

The biggest percentage of your life is devoted to business—40 years for the average man—so why not enjoy your work and the people with whom you work. Your

attitude toward each sets the atmosphere for your subordinates and your boss's opinion of your own potential. Don't get caught in a down-draft of worry, fear, and tensions.

#### 2) Analyze Your Job!

Look at yourself objectively. Is your present pace too fast or the work-load too heavy? Are work tensions making you jittery, on edge, irritable and quick to blow your top? Start now to slow down. Are you delegating as much work as you can to others? Do you make the most of your working hours? Budget your time as you do your finances. Are you using modern devices and techniques to the greatest advantage in your work? There are many time-savers.



#### 3) Avoid "Office Politics!"

Office politics are an insidious cause of emotional upset among management personnel. As a matter of fact, you might be inclined to blame "office politics" for your own shortcomings. As Benjamin F. Fairless, president of American Iron and Steel Institute, and former chairman of U. S. Steel Corp., put it in a recent issue of "Life" magazine: "Office politics" oftentimes are a myth.

#### Says Mr. Fairless:

"I have had some disappointments, times when I greatly wanted a promotion and somebody else got it. But I never figured that I was the victim of 'office politics' or prejudice or bad judgment on the

#### HARRY J. JOHNSON, M. D.

- Dr. Johnson, 54, is an old hand at preventive and clinical medicine. He has been medical director of Life Extension Examiners since 1933 and president of life Extension Foundation since 1953.
- His work with Life Extension Examiners in counseling executives and industrial retirement boards has brought him close to the physical and mental health problems of industrial executives.
- Dr. Johnson is senior attending physician at French Hospital, and the Department of Correction Hospitals, New York.



Checking in for examination at Life Extension Institute.



Blood sample is collected for laboratory tests.



Chest X-ray reveals condition of lungs, heart, may detect cancer.

#### SPECIAL REPORT

boss's part. Instead of sulking or quitting in a huff, I reasoned things out; obviously the other fellow deserved the promotion more than I did. What could I do to make myself deserving of the next opportunity?"

#### 4) Keep Home Problems At Home And Office Problems Vice Versa!

Home problems have little place at work. Others have their troubles, too. Don't add yours to theirs. Conversely, don't take business worries home. Your wife has her job to do, too; and it's not always without tribulations.

#### 5) Accentuate The Positive!

Like the medical student who "suffers" the diseases he studies, you are prone to anticipate all that possibly can go wrong in your business. Stop fretting over minor crises. Most of them will be forgotten tomorrow, anyway. Learn to accept the things you can't change; do something about the things you can change; and learn the difference between the two!

#### 6) Stop Worrying About Your Health—Do Something About It!

If business tensions are giving you symptoms of aches and pains, fatigue and chronic distress, stop worrying about your health and do something about it.

Upon examination, 75 pct of executives have some symptoms or ailment about which they are concerned. After examination, only a third of this group (25 pct of the total) are found to have any significant trouble. Yet it is important to note that the concern which 50 pct of these executives expressed rendered them as non-productive as though they were actually sick.

#### 7) Live Right!

It is difficult to maintain a healthy mental attitude toward your job, your subordinates and your superiors if your physical machinery is not in good operating condition. Intelligent living habits do much to assure the smooth functioning of all your systems—nervous, circulatory, respiratory, gastro-intestinal, etc. Food, rest, and exercise are the basic elements of life. Each must be regulated; all must be balanced to achieve vigorous health.

#### 8) Watch Your Weight!

Over-nutrition in this country is a far more menacing problem today than malnutrition. Excess weight can lead to more serious diseases—heart and kidney disease, strokes and diabetes, to name a few—and, indeed, these occur two and a half times as frequently among overweight people than

#### Easier Management Living

- 1. Look for happiness in your work . . . and help others find it in theirs.
- 2. Enjoy your work . . . but enjoy life, too.
- 3. Happy workers produce . . . your attitude is their spirit.
- 4. Keep business problems in the office . . . family troubles at home.
- 5. Be ambitious . . . but patient.
- 6. Delegate work to subordinates.
- 7. Scuttle "office politics."

#### Some Rules About Exercise

- The amount and kind of exercise you take should be determined by your physical condition, your age and the work you do.
- Never carry any exercise past the point of fatigue.
- Competitive sports should be played with caution and moderation.
- 4. Try to walk 15 minutes three times a day.
- Maintain proper posture, sitting, standing or walking. This is good exercise.



Large X-ray machine is used if followup is called for.



Basal metabolism test is made if conditions warrant.

around the office doesn't count.

Even though your muscles are get-



Executive receives recommendations based on examination.

among those of normal weight at the same age.

Watching your food intake doesn't mean that you must forego the joys of eating, the pleasant experience of tasting a new dish or the enjoyment of eating an old favorite. All you must do is control the quantity and, if you are overweight, change your eating habits for good.

ting a workout, your mind is intent on the business at hand. Walk in the fresh air and forget about everything but the scenery around you.

Swimming, bowling, golf and other sports are all excellent forms

of recreational exercise. Take your pick, but enjoy the one you select.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

#### 9) Get More Rest!

Perpetual motion has not as yet been achieved. Everything mechanical requires rest to extend its productive life. Your body is no exception. Although rest has many varied forms, in the final analysis we must rely upon our night of sleep for real rest and relaxation of the body. Some few can get along with less, but most people require about 8 hours of sleep each 24 hours. Further, you must learn to relax for at least an hour before bedtime, put aside your worries and let your body unwind.

Don't underestimate the value of your annual vacation, either. You cannot keep up the pace of business day in and day out without a break.

#### 10) Get Some Exercise!

If you are an average executive, you undoubtedly are not getting nearly enough exercise. Try to take a 15-minute walk three times a day. Walking is a good all around exercise, but walking

#### How To-And How Not To Relax!

- 1. If you must take your business work home, put it down an hour before bedtime. This will give your body a chance to unwind and you'll sleep better.
- 2. The steady use of sedatives for inducing sleep should be discouraged unless specifically advised by a physician.
- 3. Sleep may be encouraged by these harmless means:
- a) a short walk in the fresh air before bedtime.
- b) a glass of warm milk before turning in.
- c) a warm bath often induces sleep.
- 4. You need at least one day of complete rest from business out of every seven. Make sure you get it. 5. Take an uninterrupted two-weeks vacation every year.

#### How To Slim That Waistline

Here are some pointers to help you toward wiser eating:

- First, weigh yourself; then find out what you should weigh. Your doctor can give you the answer.
- 2. If your weight is above normal, decide right now to do something about it—it's too easy to procrastinate.
- 3. When you start your weightreduction program, don't regard it as a short-term diet. Change your eating habits permanently:
- a) cut out all in-between-meal snacks.

- b) cut the fat from the meat—eat it lean.
- c) forget second helpings.
- d) go easy on butter, salad oils and desserts.
- 4. Be wary of temporary weightreduction fads such as violent exercise, "elimination diets," drugs, reducing foods and laxatives. Some have their place, but only under medical supervision.
- 5. Don't be too anxious to lose too much too fast. A satisfactory weight reduction is one pound each week, 4 to 5 pounds a month.

#### MIDDLE EAST: Tighter Controls Unlikely

New crisis unlikely to bring about new controls . . . Guns-and-butter theory still holds . . . DPA gives President many control powers without new legislation in emergency . . . Stockpiles full—By N. R. Regeimbal.

◆ GOVERNMENT officials are playing down as "highly unlikely" any chances that the current Middle East war will precipitate a return in this country to controls over production, raw materials end uses, prices, or wages.

While top government officials are worriedly "watching the situation" closely it's primarily the diplomatic corps that's involved.

The "guns-and-butter" philosophy of the Korean War—we can produce enough for limited military actions without serious disruption to the civilian economy—is being followed now.

#### Not Trigger Happy

Except for the controls now already on some steel and nickel alloys, no new controls are likely unless this country becomes involved in a first-class fight.

Government officials are hesitant to even talk about the possibility of reinstating controls over metals and materials.

"All we need to get into trouble now is for this situation to touch off a lot of scare-buying and have tremendous inventories built up," one top Commerce Department official moans.

But mobilization men point out that if this country became embroiled in a hot shooting scrap and had to mobilize, the power to impose virtually any type of control is on the books—at least for a short time until Congress could be called back into session.

#### **DPA Provisions**

The Defense Production Act, under which the government now handles its allocation system for defense purposes, would permit the President to clamp production, end use and price controls over any material. And there is the belief that while it might later be open to dispute, the President could, under his inherent emergency powers, clamp on civilian wage, price and rationing controls at least until he could ask Congress for specific legal authority.

To a large extent, it is the mobilization planning of the past

five years which makes a return to controls unlikely short of a serious emergency. Stockpile larders are fairly full of a wide range of critical materials, and various incentive programs have produced new capacity which can—except in the case of steel—produce at a quickened pace to fill military need above present demands.

There is a possibility that this flareup will again touch off increased stockpiling of some items now being gathered at a leisurely pace particularly in a new category: Civil defense, civilian survival and rehabilitation materials.

#### Tanker Program

Such items as nails, hammers, row boats, generators, lumber, coal, stoves, metal beds, and similar equipment may be due for stepped up government hoarding as a result of this war scare—if that's all it proves to be.

A first concern of mobilization officials when the Suez-Israeli-Egyptian caldron began to seriously boil over, and the English

#### How Mid-East Crisis Can Affect

#### Controls:

Unlikely in anything short of serious emergency. Stockpiles are full and new capacity under incentive programs can fill added military needs.

#### Stockpile:

Increased stockpiling may be touched off particularly among items now gathered at slow pace. Increased attention on new category: civil defense civilian survival materials.

#### aw kers:

Long range tanker building program may be postponed. Shipyards would be filled re-conditioning tankers now in mothballs.



ISRAELI troops advance across Egypt's Sinai peninsula toward the Suez as world tension mounts over Mid-East crisis. But government authorities believe U. S.'s guns-and-butter economy can exist without controls.

and French jumped into the hassle, was to insure transportation of vital crude oil to Europe, and to some extent this country.

#### In Moth Balls

Mothballed World War II tankers—some of which had already been pulled out for reconditioning—were put on the ready list if the Middle East flareup threatened to continue past a week or so. This pushed consideration of the longrange new tanker building program into the background.

#### Metalworking

Present Defense Production Act permits presiident to clamp on production, end use and price controls. Inherent emergency powers would permit strong emergency measures. If the Suez area does become an important battleground, U. S. ship-yards will have to be free to reactivate the mothballed tankers to get oil around the tip of Africa. The pending super-tanker construction program is a long-range effort—three or four years, if adopted—and while the flareup heightens the chances it will be eventually approved, mobilization officials were working on a first-things-first basis.

#### Sitting Tight

Against this background, the mobilization agencies—from the cabinet-level National Security Council and the Office of Defense Mobilization on down—are now sitting tight, waiting for the diplomatic boys to dampen the warhot tempers.

No new plans are being made. ODM has a raft of possible orders already drafted, needing only refinements to meet any situation. The Commerce Department's Business and Defense Services Administration, which would administer metals and materials controls, does not have any specific plans drafted and isn't planning to write any until and unless it gets some orders from ODM.

#### Defense:

#### U. S. Urges Industry To Plan Against Attack.

The government is keeping a watchful eye on industry's plans for defending itself against attack and for getting back into operation following an attack. And Washington planners are urging businessmen to pay particular attention to planning for continuity of management, as well as continuity of production, in the event of atomic attack.

The Business and Defense Services Administration (of the U. S. Department of Commerce) is acting as head coach in the training of management officials in plant preparedness. BDSA is emphasizing in its conferences the need for (1) Keeping production going in time of emergency; (2) Getting stricken plants back into production as fast as possible after attack.

#### Banks Too

To keep industry informed, BDSA is presenting a series of "plant preparedness" talks in Washington to management officials. The military, anxious to prevent any interruption in defense goods output, provides many of the speakers. But agencies such as the Labor Dept. and Office of Defense Mobilization also are heard from on the continuity of technical skills, evaluation of bomb damage, and protection of company records.

To make certain that the banks, as well as factories, are not lagging in defense activities, examiners from three federal agencies which supervise banking are expanding their tasks. These officials, operating for the Federal Reserve System, Federal Deposit Insurance Corp., and the office of the Comptroller of the Currency, have a new list of questions for the bankers.

They want to know what each bank is doing to protect employees and facilities and to provide for management continuity, duplication and safe storage of essential records, and functioning from substitute locations.

#### THIRD QUARTER: Strike Torpedoed Earnings

Effects of five-week shutdown shown in income reports . . . However, current strong demand is creating a good last quarter . . . Operation at full capacity seems evident for first half of coming year.

◆ DRASTIC DROP in production as a result of the steel strike greatly depressed the industry's third quarter earnings when compared with 1955 figures.

However, as Eugene G. Grace, chairman of Bethlehem Steel Corp., points out, the current three months should be a "good, normal quarter" and outlook beyond that is promising.

Citing earnings of \$4.4 million or 29¢ a share for third quarter '56 as compared with \$40.3 million or \$4.04 a share for third quarter '55, Mr. Grace declared, "We lost

definitely 55 days of shipments, although the strike lasted about 35 days."

#### Full Speed Ahead

On future prospects he added, "We are back in full operation and are optimistic about it so far as its duration is concerned. We are all filled up through the first quarter and well into the second.

United States Steel Corp. reported income for third quarter '56 as \$34.8 million for a return of 4.5 pct on sales of \$765.0 million. Income for the first nine months

was \$243.3 million as contrasted with an income of \$267.5 million for the similar period in '55.

Near-term outlook as seen by U. S. Steel's David F. Austin, executive vice president, commercial, is for "strong and insistent demand for virtually all steel products during 1957, with demand for many products continuing in excess of supply, certainly during the first half of the year."

#### **Demand Makes Demand**

He underscored how demand creates demand by adding, "The process of increasing capacity (steel), in itself, generates a heavy demand for steel products. For every four tons of new capacity, one ton of steel is required for the structure and equipment. With a current planned increase of five million tons annually through 1958, the steel mills will require a total of nearly four million tons in order to reach this expanded capacity goal."

Jones & Laughlin Steel Corp. listed net income for quarter ending Sept. 30 of \$1.3 million or 13¢ a share on common stock. This compares with \$12.2 million or \$1.89 a share in this quarter 1955.

Republic Steel Corp.'s earnings for the third quarter this year were \$4.3 million as compared with \$22 million in '55.

Effects of the strike were pointed up by Inland Steel Co.'s report that, based on contrast between second and third quarters, company stockholders lost over \$8 million in earnings, employees lost over \$8 million in wages and customers lost over a 1½ months' supply of finished steel products. Inland's net earnings for third quarter were \$6.5 million as compared with \$13 million for same period in '55.

#### How Strike Hit Steel Earnings

COMPANY	3rd QUARTER 1955	3rd QUARTER	CHANGE
U. S. Steel	\$89,600,000	\$34,800,000	- 61.2
Bethlehem Steel	40,369,984	4,428,143	- 89.0
Republic	22,005,740	4,305,948	- 80.0
Jones & Laughlin	12,267,000	1,360,000	- 88.9
National	11,468,806	6,514,649	- 43.2
Youngstown Sheet & Tube	11,240,677	3,381,881	- 69.9
Inland	13,017,963	6,529,999	-49.8
Colorado Fuel and Iron	3,876,841	371,389	- 90.4
Wheeling	4,206,000	525,000	- 87.0
Sharon	1,776,903	301,507	-83.0
Crucible	2,752,293	510,226	- 81.5
Pittsburgh	2,145,983	348,190*	-116
<b>Granite City</b>	2,553,513	3,717,746	+ 4.6
Allegheny Ludium	4,015,512	556,445	- 86.1
Lukens	492,362	720,164	+ 46
Detroit	1,554,056	2,301,558	+48.1
Alan Wood	714,272	754,266	+ 5.5
Rotar Electric	960,227	6,427	- 99.3
Continental	676,469	609,370	- 9.9
Acme	1,400,000	885,163	- 36.7
Armeo	17,364,452	9,106,917	- 48.5
Barium	418,000	1,929,000	+361.4
Mc Louth	2,110,868	1,315,910	- 37.6
Copperweld	1,667,487	2,495,704	+ 49.6

\* Loss

#### FOUNDERS: Why Quality Is a Big Must

Castings buyers list quality as most important factor in making purchases . . . Price not even a close second . . . Gray Iron Founders survey shows purchasers want more information . . . Gripes listed.

◆ THE HOTLY COMPETITIVE gray iron foundry industry is laying itself open to suggestions from customers and getting an earful.

Some eye-opening answers were received in a questionnaire sent out by the Gray Iron Founders Society as a major step in a new marketing program. First results were reported at the group's 28th annual meeting at Hot Springs, and covered over 650 replies from companies buying \$124 million in castings annually. Members will get follow-up information soon.

A few highlights-

Purchasing agents rank quality above both price and delivery in importance although the report concedes many foundrymen would doubt it. Of 5 factors, quality got 66 pet of first place votes, price got 18 pct and delivery got 15 pct.

#### Need More Service

Biggest service request was for foundries to keep patterns in good repair and 71 pct of buyers would welcome suggestions on pattern changes to lower casting costs.

Most important characteristic of quality to buyers is machinability, which 82 pct gave top billing.

Pricewise, 70 pct prefer a price per piece and 36 pct want it by the pound.

Half the buyers feel over 2 pct scrap percentage is unacceptable. Yet their actual average loss comes out 5.8 pct.

Constriction of foundry markets is severe. Forty-nine pct of purchases are made within a 50-mile radius, and 36 pct from 50 to 200 miles. One buyer purchases 50 pct of his castings from a foundry over 200 miles away because of friendship created during World War II when castings were difficult to secure. Another buys cast-

ings 200 miles away, pays freight and still saves 8 to 10 pct.

#### Few Callers

One glaring statistic uncovered is that less than half the foundries call on buyers regularly in spite of the fact that they are more than welcome.

Only 3 pct of the buyers prefer to buy through manufacturers' agents but 15 pct of them do buy this way, apparently because foundrymen don't call.

Purchasing agents themselves are eager for more information which they don't get from salesmen. Over half or 55 pct admit they don't know enough about gray iron or nodular castings to do a good job. Three types of literature offered by the society got requests of 65 pct, 72 pct and 78 pct of buyers. And a whopping 92 pct said they would appreciate suggestions on design or redesign of products to lower costs or improve quality.

From a New Englander: "We need . . . maintenance of delivery promises."

"Better quality of castings must

be shipped to user. We have eliminated 85 pct of our gray iron castings—and 90 pct of the production grief—from our designs. Bearing housings requiring 0.001 in. Tolerance came to us 0.25 in. off center. Replacements took 30 days. For us you're too late."

An irate Texan said: "We would like to see small users like ourselves treated like customers rather than like pests."

Said one Ohian who purchases \$850,000 per year: "I have always made a definite effort to help my foundries and I am sure that they are in need of more."

From one happy customer: "There has been a big improvement in foundry operations in the last few years."

And a contented New Jersey man said "relations with present foundries are very good. Good castings, good service and price OK."

And an optimistic Michigander said: "If you should take the service, quality and delivery methods of foundries and lower their prices 8 pct you would have the ultimate in a PA's desires."

Weighted Vote\*

#### What Casting Buyers Look For

	(pct)	(pct)
Quality	66	41
Price	18	27
Delivery	15	24
Service	1	7
Engineering Help		1

First Place Votes

These are results of a question posed by the Gray Iron Founders Society to 650 purchasing agents buying more than \$124 million of castings annually.

The Question: Admittedly all of the following characteristics are important, but how would you rate them as to relative importance in placing a castings order?

\*Giving first place a weight of three points, second place two, third place one.

#### **TIN: Suez Crisis Threatens Supply**

Tinplate makers report 2 weeks delay in deliveries . . . Inventory situation spotty, but generally fair . . . Mills expect to get hurt if the trouble doesn't ease up within about thirty days.

• CURRENT MIDDLE EAST crisis has threatened U. S. tin users with a supply and price crisis.

The price crisis is already here, with prices soaring to the point where major tin users, particularly makers of tinplate, may be taking a beating on the basis of current tinplate prices.

The supply crisis is still in the indefinite future. But tin deliveries are subject to about two weeks delay and tinplate makers may be in serious trouble if the Suez remains closed for 30 more days.

Not all tin for the U. S. markets comes through the Suez. Much of it comes across the Pacific and is transshipped. But there, too, there is trouble. Unrest and rioting in Singapore, a major debarkation port, has cut into tin shipments.

However, it's indicated that there are no ships loaded with tin halted or tied up between Malaya and the U. S. Ships which have left Malaya have been directed either across the Pacific or around the Cape of Good Hope.

#### Price Problem

Tinplate makers, the major user of tin, are riding on relatively good inventories and anticipate no trouble for at least 30 days.

There is no question but that the mills will take a beating if the present price rise continues or holds. Sources indicate that the present tinplate price was figured on the basis of a tin price of about \$1.00 a pound, compared with the new price of over \$1.14. On a base box, the mills would be facing added costs of 14¢ or better.

A rule of thumb used by tinplate producers: for every cent the price of tin rises, it adds 7¢ to the cost of producing each ton of tinplate

It's questionable whether much tin is actually being purchased at current prices. Users would be reluctant to do so, but at the present it is not readily available on the market in any quantity.

Mills point out that the price of tin can go down as fast as it went up. On the other hand, it reached \$1.84 in 1951.

#### No Help From Stockpile

There is little possibility of relief from the stockpile. The Texas City smelter is currently on the auction block and has almost ceased to operate. Release from the stockpile is unlikely, in view of the precedent set last year in the copper shortage, when there were diversions of shipments to the stockpile, but no releases.

Exactly how much of the high priced tin will be used is difficult to determine. Tinplate mills are close-mouthed about their inventories, saying little about current buying policies.

#### **Tinplate at Capacity**

However, tin mills are working at capacity levels. Inventories of finished plate in mills' hands are low and canmakers report spot shortages. The tinplate department of one mill has been assigned its full quota for the first half next year, but needs more. This mill has had to turn down attractive export business.

Effect on next year's tinplate prices has not been indicated. Mills are bound by contract to present tinplate prices for the next six months. However, they have been sharply criticized by canmakers for past price increases and may be slow to attempt to recover losses with an increase in price extras.

Although some users express serious concern over tin supply, this is not unanimous. Some sources believe that after delays due to re-routing, tin shipments will return to normal.

#### TIN PRICE RISE: It all started . . .

#### July 26th-

Egypt announced intention of taking over the Suez.

This caused a price rise of only 3/4¢

Domestic tin price-98.50¢

#### August 31st-

Despite uncertain canal navigation, price of tin still hovered around \$1.00

Domestic tin price-100.25¢

#### September 14th-

Tin price followed tone of canal talks with relatively slight fluctuations. Talks stalled.

Domestic tin price-107.375¢

#### October 1st-

Things look good. British underwriters reduce war risk insurance for canal cargoes.

Domestic tin price-103.25¢

#### October 22nd-

Unrest reported in Malaya. Domestic tin price—107.00¢

#### October 29th-

War breaks out in middle East, curfew in Malaya.

#### October 30th-

Domestic tin price-110.25¢

#### November 1st-

Domestic tin price-114.00¢

#### **NEW WEAPON: "Ontos" Small But Deadly**

Anti-tank vehicle carries as much armament as a field artillery battery . . . Marines enthusiastic . . . Place order with Allis-Chalmers for several hundred . . . Welded armor simplifies fabrication—By K. W. Bennett.

♦ NOT PRETTY, but potent, the first production model of "Ontos" scurried off a skeleton assembly line in a Laporte, Ind., threshing machine plant of Allis-Chalmers. "Ontos" carries as much artillery as a conventional field artillery battery, and is a tank-killer capable of knocking out the heaviest tanks with its bristling battery of six 106 mm recoilless rifles.

The Marines have ordered "several hundred," and describe this concentrated bit of mayhem as having "more firepower than any other land combat vehicle in history."

It's the first, with the "mule," of the new, lighter vehicles devised to accompany an atom-age army into battle. It's one of the first in production of a series of new weapons still on the drawing boards which will begin to pass from the development stage sometime next year. It's a first among the more impressive attempts to offset Russia's reported vast numerical superiority in medium tanks with something other than the conventional one-gun tank or tank destroyer or artillery.

#### Low Cost

Briefly, this little tank-killer, no higher than a standing man, carries six rifles, four spotting rifles which fire tracers to zero in on the target. "Ontos" is powered by a 145 hp gasoline engine (a GMC 302 that looks no more complicated than a truck engine, as contrasted with the aircraft quality multiple engines used in many tank models) and will operate on 80 octane gasoline. It costs as little as one-tenth the price of the tanks its three-man crew can knock out. What's more, she can race into range at 30 mph, concentrate her six guns on target elec-



THE MARINES will be driving this new, lethal anti-tank weapon in 1957. Dubbed "Ontos," which means "The Thing" in the Greek, it packs the fire-power of an artillery battallion. Allis-Chalmers is making them.

tronically as fast as a man can think, and then fire all six guns in salvo, or singly, or in pairs. "Ontos" weigh 8.5 tons, can be air-lifted to combat.

Allis-Chalmers is the builder, with 270 subcontractors, and worked with ordnance in designing the vehicle. The tank-destroyer's light armor is sheared, welded plate; meaning that in an emergency, a wide variety of metalworking plants could produce hull components for "Ontos," as opposed to the heavy casting facilities required for manufacture of heavy and medium tank hulls and turrets.

In one respect only, "Ontos" is not more than she seems at first glance. Despite the Marine order, which will mean a sizeable striking force of these vehicles ready for field service by mid-1957, "Ontos" doesn't seem to spell a general increase in ordnance vehicle procurement. As of last week, Pentagon sources stuck to their \$200,000,000 figure for total vehicle outlay in this fiscal year. (Through June 1957.) Research in new armored equipment is known to be proceeding at a feverish pace, but few major new contracts are being let. The M-45 medium General Patton tank, backbone of U. S. armor, is produced by a single prime contractor. The big M-43 is already suspect in some quarters as too heavy for an atom-age

Only really bright spot in the Ordnance procurement picture is the secondary item market, where slight gains in dollar volume of purchases are being spread over a greater number of suppliers.

#### **METAL FOIL: Wraps Up Bigger Markets**

Although 1955 was the industry's record year, 1956 is following growth trend of the past decade . . . Slight dip due to fulfillment of federal chaff stock piling program . . . Aluminum foil is biggest seller.

◆ METAL FOIL sales in 1956 are expected to be down slightly from 1955 levels, yet the industry is generally happy about this situation.

The dropoff will be caused primarily by reduction in the amount of aluminum foil, by far the largest segment of the industry, which will be moved.

In 1954 the Commerce Dept. Census of Manufactures reports net shipments of aluminum foil totaled 153 million lb. In 1955 the industry hit its all time high with 203 million lb shipped. Prospects for 1956 indicate that shipments will total about 192 million lb.

No distress is apparent over the downtrend for several reasons.

Initially, although sales are off slightly, the long term upward movement will be maintained.

Shipments by the industry, which totaled \$60.8 million in 1947, had trebled by 1954, according to the Census of Manufactures. And 1956 shipments are expected to reach \$250 million.

#### Chaff Chief

The record sales of 1955 are not generally considered to be a normal indication of the market potential. Despite the fact that the total will be off, just about every market will use more or at least as much aluminum foil in 1956 as the previous year with the notable exception of one—chaff—strips of

aluminum foil dropped from airplanes for the purpose of jamming or interfering with radio transmissions.

Since the process of jamming by chaff has definite military implications, information about how much chaff has been bought by the chief chaff customer—the government—is unavailable. It is known that the government is no longer buying, and shipment statistics would seem to indicate its stockpile was satiated sometime in the second quarter.

#### Quarters

First quarter shipment for 1955 and 1956 are almost the same, 48,-119,000 lb compared to 48,178,000 lb respectively. In the second quarter 1956 however only 45,464,-000 lb of foil were shipped compared to over 50,638,000 lb in the comparable period in 1955.

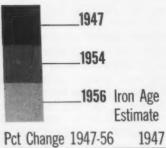
Unique feature of the metal foil industry is the fact that outside of foil, and converted foil (laminated and composition) all products are not measured by the pound. Leaf, aluminum, imitation gold and even pigment, are measured only by total value. In 1954 it ran about \$2.1 million worth.

Gold leaf is calculated by books of 500 sheets, and by various size rolls. In 1954 there were 37,097 books using gold foil and total rolls amounted to little over one million.

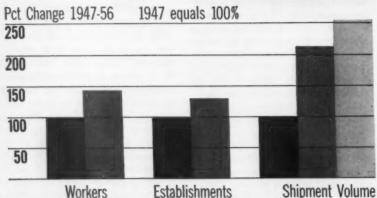
Major precious metal rollers, responsible for a large part of the gold and silver foil on the market, expect very little change in 1956.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

#### Foil Sales Head Up



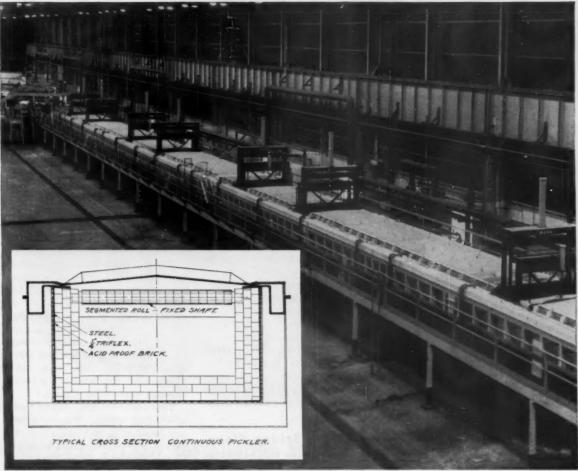




Source: 1954 Census of Manufactures

SHIPMENTS BASED ON '47 DOLLARS

### **B.F.Goodrich**



Continuous pickling line engineered and built by Wean Engineering Co.

## Continuous pickling line at work 4 years, looks good for years more

THE high speed, efficient pickling line at U. S. Steel's Fairless Works is now in its fourth year of continuous service with only a minimum of maintenance. The reason: B. F. Goodrich Triflex rubber lining. The result: big savings through lowered pickling and maintenance costs.

Twenty years ago such tanks were an innovation. Today, the steel, rubber and brick pickling tank is a standard specification. But the fact remains that just any tank of this type construction will not solve your pickling problems. It is B. F. Goodrich Triflex lining that ends leaks. This lining is not one layer of rubber, but three—hard rubber for acid resistance sandwiched between

soft rubber for protection—with expansion joints which let the rubber expand and contract with the steel to which it is attached.

Remember, Triflex lining and expansion joints, the Vulcalock and Unilock processes for attaching rubber to steel, and brick sheathing are all B. F. Goodrich developments. Out of the hundreds installed during the past 25 years, not one has ever failed to end costly shutdowns for repairs and all other forms of pickling tank troubles.

Your specification of a B. F. Goodrich rubber-lined tank brings you, in addition to these proven construction features, the engineering experience of a group of men who are thoroughly grounded in modern pickling practice and capable of designing tanks to your individual needs. It is this record of past performance and experience which insures the economy and efficiency of every B. F. Goodrich installation. B. F. Goodrich Industrial Products Co., Dept. M-776, Akron 18, Obio.



#### Tax-Am:

#### Barium subsidiary wants rapid write-off.

Phoenix Iron and Steel Co., Phoenixville, Pa., a subsidiary of the Barium Steel Corp., has filed a request for fast tax amortization on a proposed expansion with the Office of Defense Mobilization.

Phoenix wants to put in a new blast furnace, coke ovens, a wide flange beam and a plate mill. Total cost is expected to be about \$134,255,000.

During the last several months the steel companies have asked for rapid write-offs for projects which will require expenditures well in excess of \$1 billion. Final action will depend on the findings of the ODM steel situation study, now in progress.

#### Road Program Boon

A 30 pct expansion of manufacturing and engineering facilities at Nelson Stud Welding Div.'s Lorain, O., plant has been authorized by the board of directors of Gregory Industries, Inc.

The federal government's proposed \$33-billion highway program was cited as the chief reason for the expansion. Construction of a 15,000 sq ft addition to the division's plant will start immediately. Production equipment is expected for delivery next year.

#### Big Truck Order

An order for approximately \$13 million worth of  $2\frac{1}{2}$ -ton military trucks is to be placed with Reo Motors, Inc., Lansing, Mich., by the Army.

Negotiations with the manufacturer are being handled by the Detroit Ordnance District. The work will be performed in Lansing and is expected to aid materially in reducing the unemployment problem in that city. Lansing is classified by the U. S. Labor Dept. as an area of "relatively substantial labor surplus."

Reo is experienced as a producer of military trucks. Indications are that the vehicles it will build under the new contract will go to other nations as part of the military arms aid program.

#### Automatic Mill for J&L

Westinghouse Electric Corp. is installing \$1.5 million worth of electrical equipment in what is expected to be the industry's first card-programmed automatic roughing mill at Jones and Laughlin Steel Co.'s Aliquippa Works.

The unit, a 6000 hp universal reversing rough mill, will feed a six-stand continuous hot strip mill. Production data will be fed to the mill in the form of punched IBM cards.

#### **Dominion Bridge Plans**

Dominion Bridge Co., Ltd., Toronto, is planning to spend \$20 million during the next four years to expand its nine plants and six subsidiaries across Canada.

A new fabricating shop will be built at Mount Dennis and substantially increased warehouse space provided at the Shaw Street plant in Toronto.

#### Millions for Welding

Industry in the U. S. spent over \$700 million for welding equipment, supplies and gases last year, according to the Small Business Administration.

Eighty-five pct of all industrial plants in the nation use welding for production and maintenance, although primary use of welding is for production, the SBA points out in a new leaflet "Modern Welding Practices," one of a series on Technical Aids to Small Manufacturers.

#### More Boom Ahead

More and more, all the economic signs point to continued boom business right through the first half of 1957.

Up to now, few forecasters were willing to stick their necks out beyond the first quarter of next year, but evidence is piling up in government economic planning circles that the present high plateau of prosperity will hold up for at least eight to nine more months.

Metalworking is a sure-fire bet to share in this extended prosperity. High-pressure demand for just about everything made of metal is going to surge right through next spring. (These views come from non-partisan government economists, not from Administration appointees who often view the business picture through rose-tinted glasses.)

This super-charged pace of manufacturing activity is being noted and acted upon by jobbers and retailers, who firmly intend to catch all the consumer dollars they can.

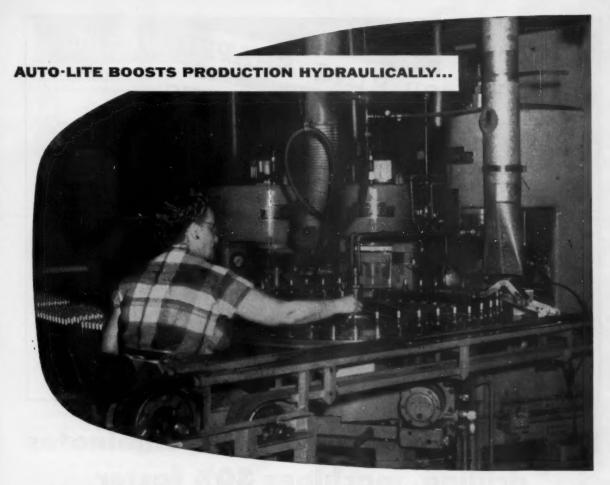
#### **Expansion Briefs**

Lockheed Aircraft Corp., Georgia Div.; will build and operate a \$2.3 million nuclear support laboratory for the Air Force at Dawsonville. Ga.

General Dynamics Corp., General Atomic Div.; a research reactor at its John Jay Hopkins Laboratory, San Diego; completion by end of 1957.

Computer - Measurements Corp., North Hollywood, Calif.; merging with Hancock Manufacturing Co., Jackson, Mich.; will increase C-M's production and sales facilities; no change in names or management.

Joseph T. Ryerson & Son, Inc.; a warehouse at Charlotte, N. C.; completion in late 1957.



### **MULTIPRESS** installation automates assembly operations

- \* Sets new safety levels
- \* Reduces tool and die costs, eliminates down-time
- \* Improves product quality, provides for future expansion

The installation of seven 48-station Multipresses at the Fostoria, Ohio, plant of Electric Auto-Lite has introduced added efficiency into a critical production stage — final assembly of spark plugs.

One unit with a single operator (1) pre-presses the top gasket of a spark plug to centralize the insulator within the shell; (2) cold forms the shell to anchor the entire sub-assembly as an integral unit; and (3) seals the shell and insulator. These operations had required three individually operated presses.

Since Multipress equipment was installed, materials handling has been reduced and tool and die costs cut substantially. Down-time has been virtually eliminated; maintenance can be carried on without interrupting production. Exact control over force application is now possible, with improved product quality control a direct result.

The experience of Auto-Lite is typical of hundreds of companies who have found that a Denison Multipress, with its automatically controlled hydraulic ram, can produce a better product... faster, more efficiently, and at less cost. Write for complete details.

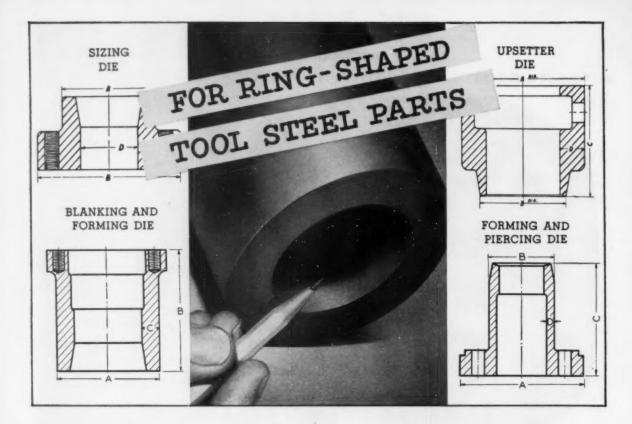
DENISON ENGINEERING DIVISION

, American Brake Shoe Co.

1242 Dublin Road . Columbus 16, Ohlo

HYDRAULIC PRESSES . PUMPS . MOTORS . CONTROLS





## New Graph-Mo Hollow-Bar eliminates drilling, machines 30% faster

MAKERS of ring-shaped tool steel parts who use Graph-Mo Hollow-Bar will tell you it speeds up production, cuts down waste, and saves steel. That's because the hole is already in it. There's no drilling, you start with finish boring.

What's more, you get all the proved advantages of Graph-Mo that have made it one of the most popular tool steels—excellent machinability, wearability, and stability.

Graph-Mo machines 30% faster than other tool steels and has a minimum tendency to scuff or gall. The combination of free-graphite and diamond-hard carbides in its structure gives it exceptional wearability. Users report that Graph-Mo outwears other tool steels on an average of 3 to 1.

Graph-Mo also is the most stable tool steel ever made. For instance, a Graph-Mo steel master plug gage showed less than 10 millionths of an inch in dimensional change after 12 years of use. And Graph-Mo responds uniformly to heat treatment, too.

If you make ring-shaped tool steel parts, make sure you get all the advantages of Graph-Mo Hollow-Bar. Sizes range up to 16" O.D. with a variety of wall thicknesses. It's made by the specialists in fine alloy steels, The Timken Company.

Graph-Mo Hollow-Bar is distributed through A. Milne and Co. and the Peninsular Steel Co. warehouses.

To find out more about this tool steel, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

#### REPORT TO MANAGEMENT

#### Another Day, Another \$16

For the first time in history, the average U.S. worker is taking home a paycheck based on an average of \$2 per hour.

Of course, his take home pay doesn't reflect that figure, and he may have a lot to say about higher prices, lower buying power. But, nevertheless, the new level marks a significant milestone in labor history.

It's more significant when compared with the fact that the rate climbed from \$1 per hour in 1944 to the present rate in a little more than 12 years.

The previous 100 pct climb, from 50¢ per hour to \$1, took from 1920. Actually, the rate declined below 50¢ in 1922 and again in 1932 and 1933, which tends to make the climb less startling by comparison.

#### **Metalworking Pays More**

As a metalworking executive, this rate for overall U. S. shouldn't be startling to you. Chances are, your company has been paying \$2.00 or over for several years.

A full 61.4 pct of primary metals workers have been making \$2 per hour or better since 1953. A third of all workers in the machinery industry were doing as well and two thirds of workers in the transportation equipment field were also drawing down better than \$2 an hour in 1953.

Nine out of ten workers in primary metals, machinery, transportation equipment, printing, ordnance and petroleum have an average pay of \$2 per hour. But workers in tobacco, textiles, lumber and leather generally do not make that figure.

Something to consider is that the average work week is currently just about 40 hours, indicating that the \$2 average pay is based on little or no overtime.

#### Where is Pay Highest?

You can compare your company's rate with general area pay by checking gross average hourly earnings of production workers in manufacturing in these metropolitan areas. (U. S. Dept. of Labor Bureau of Labor Statistics is source.)

On Aug. 1, 1956, rates were as follows: Los Angeles, \$2.21; San Francisco, \$2.29; Washington, D. C., \$2.10; Chicago, \$2.19; Baltimore, \$2.05; Boston, \$1.88; Detroit, \$2.48; St. Louis, \$2.07; Cleveland, \$2.28; Philadelphia, \$2.06; and Pittsburgh, \$2.36.

#### At Least FRB Wasn't Political

By now it's too late, obviously, for any action on tight money to have any effect on the election. Those who predicted easier money for political reasons were off base. True, there was some attempt to ease home building requirements, but no all out effort in advance of the election.

But the chorus continues that the FRB held onto its tight money policy too long. Economist Eliot Janeway, who has opposed the policy strongly, is now even more outspoken against the tight money policies of the FRB and Secretary of the Treasury George Humphrey.

Mr. Janeway says:
"One of the complications involved in this
debate is that common sense assumes that
good timing means easing money before business is hurt, while the . . . theory ruling us
stipulates that good timing calls for easing
money after business is hurt."

Meanwhile, businesses are finding it tougher to get necessary money for short term and long term loans, are bidding up interest rates to the point where they may be too expensive in many cases to pay off out of future returns.

#### INDUSTRIAL BRIEFS

International Relations...
Blaw-Knox Co. and Fried, Krupp
of Essen, Germany, have entered
into an agreement to exchange
technical information in the development of sales and in the production of ferrous and nonferrous
rolling mills in countries outside
the United States and Canada.

Atoms at Work . . . First production by private industry of enriched uranium for use in generating commercial electrical power from atomic energy is now in operation at the Mallinckrodt Chemical Works' plant at Hematite, Mo. Of the two grades of uranium dioxide being produced, the ceramic grade is designed for use in pellet form, while the other is sintered or high-fired materials which is for use in "Matrix" or "ceramet" type fuel elements.

One Man Gang . . . "Getman Scoot-Crete," a small truck is now being marketed and distributed by its manufacturer, Getman Bros. of South Haven, Mich. One man can load, drive and dump the truck carrying loads up to 3,500 lb at speeds up to 15 mph. Price ranges from \$865 to \$1,889.

Infra Red Eye . . . A new electronic infra-red analyzer, designed to fill the need for a moderately-priced instrument for most continuous - flow chemical analysis problems, has been put on the market by Mine Safety Appliances Co., Pittsburgh.

Tramp, Tramp, Tramp... "Aluminum on the March" is a 28-minute color motion picture telling the story of aluminum from the milehigh bauxite mines of Jamaica to the mile-long rolling mills of the Midwest, is now being released to community groups and TV stations through Association Films.

Porter Scores Again . . . H. K. Porter Co., Inc. has acquired the business of West Virginia Steel and Manufacturing Co., Huntington, W. Va. Announcement was made by B. Campbell Blake, vice president and general manager of Connors Steel Div., with which division the new plant will be combined. The acquisition will be known as West Virginia Works, Connors Steel Division.

By a Dam Site . . . A \$2,671,109 contract to build two additional hydraulic turbines for Garrison Dam on the Missouri River 70 miles north of Bismarck, N. D., has been awarded to the Eddystone Div. of Baldwin-Lima-Hamilton Corp. by the U. S. Corps of Engineers.

Tar Heels... A manufacturing division sales and warehouse building has been opened by Republic Steel Corp. in Charlotte, N. C. for the manufactured steel products in the Carolinas and Georgia. New installation will supply the three-state area formerly served by the company warehouses in Baltimore and Chattanooga, Tenn.

Shhh... Westinghouse Electric Corp.'s Transformer Div. has reduced prices on transformers having lower-than-standard noise levels. The new policy is effective immediately for all new power transformers rated above 300 kva.

Supersonic Switch . . . A contract to modify a fleet of Convair F-102A all-weather supersonic jet interceptors from test to tactical configuration has been awarded the Fort Worth plant of the Convair Div. of General Dynamics Corp. by the U. S. Air Force, Work will commence in December.

Nuclear Tools... Atomic Power equipment relating to the application of atomic energy to industrial purposes will be shown by the Westinghouse Electric Corp. at the National Exposition of Power and Mechanical Engineering, Nov. 26-30, at the New York Coliseum.

Practical Reactor ... A research reactor with safety and utility features will be constructed by General Atomic Div. of General Dynamics Corp. at the site of its John Jay Hopkins Laboratory for Pure and Applied Science in San Diego. Scheduled for completion by the end of 1957, it will be a major tool in the laboratory's investigations in the nuclear energy field.

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SERVICE



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STROM PRESSED METAL CO., INC.



#### How Great Lakes Steel

#### charts quality





Left: Thermocouple is inserted into an open-hearth furnace to check temperature of heat. Right: Multiple indicator records open-hearth temperature.



This view shows 12 of Great Lakes 17 open-hearth furnaces. Bright scots are furnaces being charged with pig iron and scrap. The open-hearth process takes from 10 to 12 hours.

This is the business end of a thermocouple, the rugged yet delicately accurate device that measures temperature in an open-hearth furnace. The two fine wires you see above, inside the casing, absorb heat and transmit it as an electrical current to be charted by recording potentiometers.

No chance for guesswork here—through eleven long hours the rising temperature of what will be 500 tons of Great Lakes open-hearth steel is meticulously controlled. Then, at exactly the right time and the right temperature, the glowing molten metal gushes into ladles for pouring into ingots.

The slender, spidery lines on the chart assure another heat of high and uniform quality steel. Quality that is checked and rechecked at every step to assure that customer specifications are met precisely.

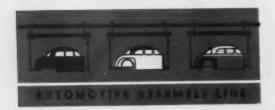
Why don't we get together and talk over your steel needs? Some time soon?

#### **GREAT LAKES STEEL CORPORATION**

Detroit 29, Michigan . A Unit of

NATIONAL STEEL L CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.



#### Plan For Engine Retooling In 1958

Barely catching their breath after 1957's \$1 billion changeover program, automakers are eyeing 1958... And they see more retooling expenses under the hood... Horsepower probably will increase—By T. L. Carry.

◆ THE 1957 MODEL YEAR is generally conceded in the auto industry as the year of the "big change." With few exceptions just about every producer in the business has come out with a new body in addition to other major changes.

The whole program is conservatively estimated to have cost the industry at least \$1 billion. Most of this sum was spent on changes that will last a minimum of two years. As far as external appearances are concerned, 1958 figures to be a facelift year.

But there are still changes in the works. So the emphasis next year will be placed on powerplants.

Saddled With Horsepower . . .

It's almost a sure bet that there will be several new engines introduced in 1958. For some producers it will be possible because the tooling costs for old engines have been amortized. For others, it will be a case of being forced to toss out the old engine to keep up with the competition.

Since the end of World War II, the industry has been involved in a terrific horsepower race. In some cases, hp has almost tripled since 1946.

As a result, some automakers who might have been content to go along with old powerplants find themselves in the position of being forced to spend money for new tools in order to stay competitive.

Ordinarily, auto engines are designed so that manufacturers can increase hp gradually from one year to the next without having to build an entire new engine. Under the normal scheme of things, tooling costs are amortized by the time the engine has reached its maximum.

Theoretically, this is a fine idea. But the hp race in many cases has caught producers in a vise.

Next Year's Field . . . In 1958, you can expect at least three and possibly four new engines.

First on the list is the Ford Motor Co. It's an open secret that Ford is one of the producers that was caught short in the hp race. Right now the company has about as much as it is able to get out of its present engine.

In November of 1955, Ford started releasing orders for tooling on new powerplants. It is estimated that altogether the company will spend close to \$100 million on the project.

Actually, Ford will be bringing out 2 new engines. One will be used on the Ford and the new E car. The other is expected to show up on the Mercury.

In all, the company will install



1957 Olds Gets Biggest Change in 20 Years

◆ ENTIRELY new styling in the 1957 Oldsmobile line is noticeable in the Golden Rocket "88" Holiday sedan (above), featuring 18 pct more glass area, an all-new front, improved suspension, wider chassis and an exclusive printed electric circuit for the instrument cluster (right). With the printed circuit, a single wire leads to the instrument panel, replacing 14 separate connections. It reduces hazard of short circuiting and simplifies maintenance problems.





"Bolt" problems...two kinds

A LIGHTNING BOLT flashes from angry skies. What happens to electrical service? Nothing. This is one kind of "bolt" problem the electrical industry has learned to cope with.

But how about the mechanical kind of bolt used to connect electrical lines and equipment? They have to be strong and flawless, these fasteners...and completely reliable...to maintain service under all conditions.

There's a good answer now to that too: Silicon bronze fasteners...strongest of all highly conductive fasteners. RB&W was first to work this material successfully into standard fasteners.

#### RBAW -- A MAJOR SUPPLIER TO INDUSTRY

A leader in its field for over 111 years, RB&W turns out the finest quality standard fasteners for the electrical as for virtually all major manufacturing industries. Modern facilities, new techniques, long experience... all combine to make RB&W fasteners truly the "strong point of any assembly."

Impressive savings can be realized on fastener costs by proper application. It might pay you well to have the RB&W "Fastener"

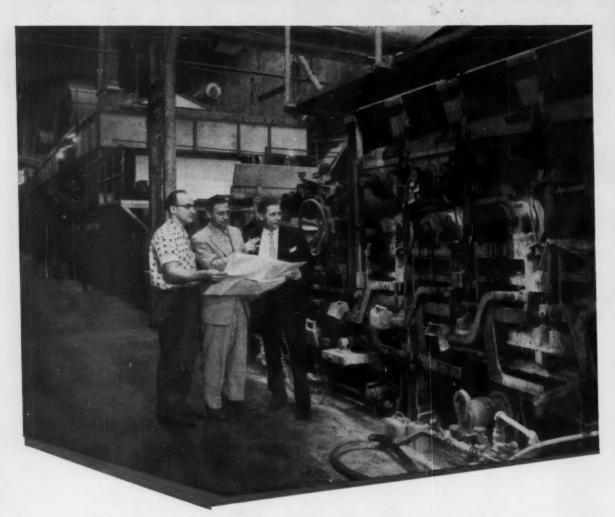
have the RB&W "Fastener Man" take a good look at your requirements.



RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. Sales agents at: Milwaukee; New Orleans; Denver. Distributors from coast to coast.

RB&W FASTENERS - Strong Point of any assembly



#### how Bearings, Inc. goes to work for ...a boxboard plant

Here's service with a capital "S" as we see and practice it at Bearings, Inc.! In the photograph are: left, B. H. Weideman, Millwright Foreman; J. A. Rupp, Maintenance Superintendent of the Ohio Boxboard Company plant at Rittman, Ohio, and the Bearings, Inc. salesman, Jack Houser.

They are going over the final phases of a "bearing survey" Jack has been making for the company over the past six months. In this "survey" every bearing in every machine and pump in the Mill Division was located. The make, type, size and fit of over 4,000 antifriction bearings was determined.

The result of the "survey" has been very gratifying to plant executives. Information on every bearing is now at hand, instantly. Inventories of bearings are being steadily reduced and when the records show, to cite only one example, that 6 large, expensive bearings on 3 mills were identical except for a slight and unnecessary variation in internal fit, then no longer do they stock 4 replacements, 2 are plenty!

Do you need this kind of Bearings, Inc. service in your plant? We'll soon tell you . . . all you have to do is ask, no obligation of course.

> Rendering bearing service in the territories adjacent to our branches, listed below.



Kentucky Ball and Roller Bearing Co. . Louisville, Ky

#### **Automotive Production**

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Nov. 3, 1956	124,360	20,647
Oct. 27, 1956	109,476	23,656
Nov. 5, 1955	173,000	26,950
Oct. 29, 1955	163,532	24,751
To Date 1956	4,979,564	1,009,335
To Date 1955	6,978,997	1,121,875

\*Estimated. Source: Ward's Reports

five engine lines. Two will be at the nearby Rouge plant, two others will be operating in Cleveland and one will be installed at Lima, Ohio.

In addition, Chrysler Corp. is rumored to be developing a new "C" engine which will be used on the company's higher priced cars.

As far as GM is concerned, Oldsmobile will probably offer an engine with two 4-barrel carburetors in '58. This will provide one barrel for every cylinder in the engine. It is the closest you can come to fuel injection without actually having it.

#### Prices:

#### Only American Motors and Ford offer decreases.

Along with the new car announcements comes a rash of price adjustments. In almost all cases prices have been raised.

With the exception of Hudson, Nash and some Ford models, every producer has increased factory list prices and blamed higher costs for the move.

American Motors Corp., because of a \$22 million decrease in its operating costs, has cut the prices on Nash and Hudson from \$236 to \$378. At the same time, the company has increased the price of its Rambler from \$85 to \$117.

Cadillac's suggested list ranges upward from \$348 for the least expensive model to \$647 for the 75 Imperial. Buick's prices have gone up from \$173 to \$264 with the biggest increases coming at the top of Buick's line, the Roadmaster series.

Oldsmobiles have been increased from \$132 to \$284; Pontiac's new prices are up \$100 to \$280.

Plymouths have gone up from \$66 to \$160 and new prices on the Dodge line range from \$64 to \$192 more.

It is significant to note that Plymouth's new prices are more in line with those on the Ford and Chevrolet. A new Plymouth now costs only \$18 to \$19 more than the other low priced cars. Introduction of new work standards and more efficient methods of production has enabled Plymouth to become more competitive.

In many instances, equipment which was formerly optional has become standard and some optional equipment has actually decreased in price.

Take the Dodge for example. Air conditioning has gone down \$100 in price. A power package is standard equipment on the Custom Royal. Prices have also been cut on tinted glass, and radios.

#### GM's Last Word

General Motors Corp. intended to introduce the remainder of its 1957 cars this week with one big splash. Unfortunately things didn't work out the way they were planned.

Cadillac's introduction has been

#### AUTOMOTIVE NEWS

delayed 5 days, but the Buick, Pontiac and Oldsmobile are being shown on schedule.

The most marked styling change this year is evident in the new Pontiac. Straight lines have replaced the bumps in front and rear quarter panels. The "eyebrows" on the front fender have been eliminated and a new rear fender is somewhat similar to those on Buick.

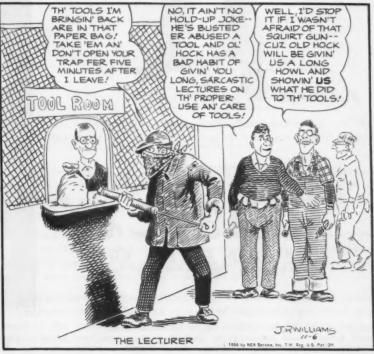
Overall length of the Pontiac has been increased 1.2 in. Engines range in hp from 252 to 270. They feature a 10 to 1 compression ratio with an automatic transmission.

The 1957 Oldsmobile is over 2 in. lower and nearly 5 in. longer. It has a new body with even more massive bumpers and a redesigned grille. The frame, in addition to being heavier, is 8 in. wider. Engines develop 277 hp and a 4-barrel carburetor is standard.

Ball joint suspension is one of the new features of the 1957 Buick. The car has a new body and a more powerful V-8 engine.

#### THE BULL OF THE WOODS

By J. R. Williams



# GOOD AND STRAIGHT-WON'T Whip!



## Chase &

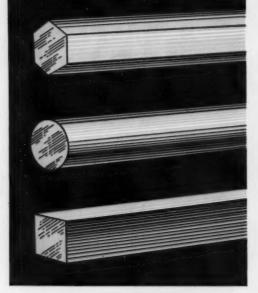
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Screw machines really purr along when you feed them Chase Free-Cutting Brass rod! Uniform lengths and straight lengths that won't whip, superior machinability, longer runs before regrinding tools, all mean more pieces per length, fewer rejects and less down time per machine. Order from your Chase warehouse!



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#### Govt. Competition with Business Eased

Administration quits 500 operations in competition with private business . . . Defense Dept. alone halts 355 commercial activities . . . Result is more than \$1 billion turned over to U. S.—By G. H. Baker

◆ THE ADMINISTRATION, reversing the trend of big government, has in the past three years discontinued almost 500 government operations which were in competition with private industry.

The drive to untangle the government from the hair of private business—one of the principal recommendations of the Hoover Commission—has resulted in more than a billion dollars being turned over to the U. S. Treasury. This money came from the liquidation of the Reconstruction Finance Corporation and from the sale to private industry of such government ventures as the synthetic rubber plants, the inland waterways barge lines, and other plants and services.

To Name a Few . . . In the past three years the Defense Dept. has discontinued some 355 commercial-type activities—including office equipment and automotive repair shops; tree and garden nurseries; cobbler shops; and cement mixing plants. In addition, the civilian agencies of government have discontinued or curtailed 137 competing operations, including bakeries, ice manufacturing plants and ice cream plants.

According to the U. S. Budget Bureau, the criterion being used in evaluating each operation is whether it is in the "public interest."

In some cases, Budget Bureau Director Percival F. Brundage says, the Administration has decided it would not be "either practicable or economical" to halt an operation because the service or product was not available on a

competitive basis in a location where needed. In some other cases security was a factor in not discontinuing a business operation.

Next target of the decompetition drive will be to knock out as many of the government-operated services as practical, such as laundries, and commercial photographic and duplicating shops.

#### Secrecy Hit

A congressional committee, disturbed over the creeping trend toward secrecy in federal operations, is proposing that government agencies be compelled to let the press and the public in on what they're doing.

Rep. John E. Moss, D., Calif., chairman of a House subcommittee looking into censorship, wants to make it possible for any citizen to get a court order compelling reluctant bureaucrats to make public their actions.

As matters stand now, government officials have the last word in deciding whether or not they'll let anybody know how they spend the taxpayers' dollar. If they refuse to talk, there is no recourse.

Mr. Moss points out that bureaucrats are lacking in any constitutional authority for keeping information bottled up. But they get away with it because the courts generally have supported the bureaucrats.

Moss thinks it's high time for the Congress to spell out the rights of the press and the public to obtain information. Secrecy in government operations has been on the increase for years, despite protests of innocence from the bureaucrats. Moss offers a chance to business, industry, and the public to dissolve some secrecy.

#### Workers Take Advantage of T-H

- Employees make far greater use—and advantageous use— of the Taft-Hartley labor law than do employers, new government figures show.
- Union leaders, in their frequent criticism of the Taft-Hartley law, give the impression that T-H is slanted entirely on the side of management, and that workers haven't got a chance to improve their lot.
- Nothing could be farther from the truth. The new figures, released by the National Labor Relations Board, show that employees filed 1095 cases with the government in the fiscal year that recently ended, whereas employers filed only 615 cases.
- A recent survey by the National Right To Work Committee (advocating voluntary unionism and opposed to compulsory unionism) says most of the cases alleged coercion of employees reluctant to join unions but were pressured by fellow workers.

## Synchronous Speed with Induction Simplicity

# New ynduction Motor

#### ... has uses in:

- Synthetic Fiber Production
- Wire Drawing
- Plate-Glass
   Conveyors
- Packaging Machinery
- Food Processing
- High Speed
   Cameras

- Metering Pumps
- Electronic Computers
- Printing Presses
- Frequency Converter Sets
- Drives for Electronic Power Supplies
- Continuous Bristle
   Cutting

#### Do YOU Have an Application?

Allis-Chalmers engineers are anxious to help you determine where *Synduction* motors can improve your operations. Call your A-C office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin, for Bulletin 51B8440.



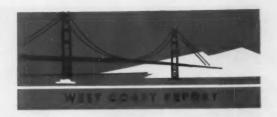
- Constant speed, regardless of load or voltage, depends only on frequency
- Synchronized speeds for a number of motors
- Adjustable speed by frequency control at any speed setting

Allis-Chalmers new development—the Synduction motor — now makes these characteristics available at low cost. The sturdy frame and simple design, similar to that of a squirrel-cage motor, eliminates collector rings, brushes and rotor insulation — cuts maintenance. Other important advantages include across-the-line starting, wide range of speeds and high efficiency.

Synduction is an Allis-Chalmers trademark

## **ALLIS-CHALMERS**





#### Smog Forecast for L. A.—Years of Tears

Los Angeles, in midst of multi-million dollar air pollution struggle, finds going rough . . . However, they've got some practical tips on meeting the menace . . . Pinpointing smog's sources aids—By R. R. Kay.

◆ SMOG WARFARE on the Los Angeles front is a multi-milliondollar battle. The outlook? Not so good. It will get worse before it gets better. And before it's licked, it will take many more millions for many more years.

Industrialists all over the country have a stake in this fight in the Coast city. Smog's rapid rise as a national problem is already claiming the attention of many people across the U.S.

Five Rays of Light . . . Can the Los Angeles fight provide any answers?

The County's experienced Air Pollution Control District suggests to business and industry: (1) Get to know every possible source of air pollution in your own firm; (2) Appoint an air pollution control man. Have him develop and manage your program; (3) Know the air pollution laws-and obey them. Over 100 cities now have smoke ordinances; (4) Push your trade and professional associations to get in the act. They can plug for research and development of better control equipment; and (5) Encourage these groups to sponsor information clearing houses in your own segment of industry. Give them anything you have on: control techniques, procedures, equipment.

Auto exhausts are a major smog-producing suspect. So, here are a few more tips: (1) Help employees set up car pools. This will cut smog-forming gas vapors, especially during the hot months; (2) Keep your automotive fleet in top shape. Good service and pre-

ventive maintenance not only cut exhaust but save transportation dollars; (3) Teach your company drivers good driving habits. Try to get them to cut down on uneven stop-and-go; and (4) Keep out of congested traffic areas. If you can, schedule your fleet so as to avoid peak-hour driving in them.

If your company has combustible refuse, haul it to a central disposal site.

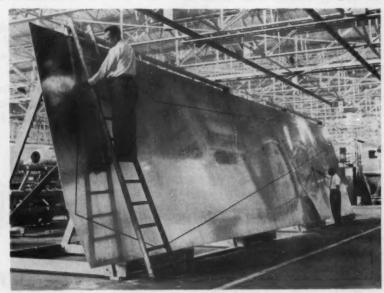
What They Know . . . In the thick of the Los Angeles battle

are: Federal, state, county governments; private industry; a dozen major research agencies from coast to coast. So far, they've learned this:

Pollution from industrial sources is on the downgrade. But aerial junk from auto exhausts and single-chamber incinerators—the backyard type—is on the increase.

There are over 50 different contaminants found in smog. Some are inert; however, on the other hand, some of them have an extremely reactive potential.

#### **Giant Aerial Tailoring Job**



WINGS TO LIFT the Douglas Aircraft's DC-8 are being cut from these large tapered sheets of aluminum. Out-sized slabs, which come already tapered from Aluminum Co. of America, are 124 in. wide by 550 in. long and taper from a maximum of 0.230 in. thick to 0.129 in. thick in 175 in. distance.



IT'S EASY to reduce annoying and expensive oil leakage like that shown here. The simple act of switching to a Suntac oil—without making any other changes—can cut leakage an average of 35%...sometimes 90%!

## SUNTAC STOPS SHUTDOWN CAUSED BY OIL LEAKAGE

A manufacturer was having trouble with oil leakage and throw-off from bearings of overhead shafting. This resulted in hazardous conditions and low employee morale. Production had to be shut down frequently. Oil costs were high.

A switch to a Suntac\* lubricating oil solved these problems.

If you're losing oil through excessive leakage from rotating or sliding parts, a Suntac oil can cut your consumption an average of 35%. These oils are especially compounded to reduce drip, throw-off, squeeze-out; their greater adhesiveness enables them to cling firmly to the parts...as they lubricate.

Suntac oils can reduce consumption up to 90% when used in hydraulic systems, circulating systems, and in other continuous use applications.

For further information on versatile Suntac oils, see your Sun representative or write Sun Oil Company, Philadelphia 3, Pa., Dept. IA-11.



## INDUSTRIAL PRODUCTS DEPARTMENT SUN OIL COMPANY Philadelphia 3, Pa.

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#### An Answer To A Maintenance Prayer?

Machine tool builders taking long look at printed circuits as possible answer to automatic machinery repair problem . . . Advantages are less down time, lower initial cost—By E. J. Egan, Jr.

♦ BUYERS of tomorrow's automatic machine tools may benefit from the use of printed circuits similar to those currently used in radio and TV receivers. Such circuits are considered to be more trouble-free and easier to maintain than control components wired and soldered in the conventional way.

At present, printed circuits are found primarily in communications equipment, guided missile control elements and "magic brain" computers. But the presence of machine tool design engineers at the Formica Corp.'s printed circuit forum in Cincinnati last week seems significant.

From the customer's point of view, machine tools that are controlled automatically by electronic wizardry are fine—as long as they work. Big question in the buyer's mind: "What do I do when the thing blows a tube or burns out a resistor?"

Hire or Train . . . That's not an easy question to answer. Machine tool customers, seeking to plot their own course in the automation era, are constantly reminded that they'll be buying plenty of complexity along with super speed and accuracy in future models. Advice usually offered is to hire competent maintenance technicians, or upgrade present machine operators to that status.

Some users are frank to admit they can't see the sense of buying expensive automatic equipment if it means they must replace machine operators with an equal number of skilled maintenance men. They wonder if they're going to pay too high a premium for faster, more accurate equipment.

Faced with this reaction from even a few potential customers, builders can't afford to pass up anything that offers possibility to simplify machine tool controls. Printed electronic circuits could be an important step in this direction.

Platform . . . Advocates of printed circuitry claim an impressive list of cost advantages as well



"Listen to G. B. will ya! He's all fired up about our tests on the new refractory!"

as service benefits. Printed circuit boards can be mass produced at low cost. Circuit components can be mounted on these panels and soldered into place automatically. Resulting absence of wires and minimum chance for loose connections means that circuits would be practically impervious to damage from dust, dirt and vibration, they say.

Printed circuit enthusiasts point out that these service characteristics virtually rule out the worrisome maintenance problem. They look to the possible use of economical plug-in circuits that can be discarded if they become defective. Quick, simple replacement with a new unit would keep machine downtime to negligible levels.

Aside from the simplified maintenance potential offered by printed circuits, it's not likely that either machine tool builders or buyers would overlook the angle of initial cost reduction.

A Few Who... At present, control equipment is a big item in the cost of an automatic machine. Clue to what might lie ahead is offered by Jack Cochran, Formica's research and development director, who cites the fact that printed circuits have enabled one major TV manufacturer to produce a 21 in. set for less than a set one-fifth as large cost in 1947.

He also reports the case of a San Francisco instrument maker who has cut his labor cost 60 pct by changing over to the use of six square feet of printed circuitry in one instrument.



## WHEELABRATOR S

makes cleaning dollars go twice as far at INDIANA FORGE and MACHINE CO.

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Super Tumblast

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For example, the machine operates only as long as necessary to achieve the cleaning required. The timer permits tumbling of the work to clear pockets and cavities of abrasive. The of push button shaker type conveyor used in unloading is another safeguard against abrasive carryout. Its perforations permit abrasive to fall through into a reclamation device, and thus keep abrasive consumption to a minimum.

Abrasive costs have been reduced 68% at Indiana Forge & Machine Co. The first set of blades ran 596 hours and no other wearable part has as yet been replaced.

And now Wheelabrator has made these advantages available for more applications by adding two smaller size units to its Super Tumblast line. Whatever your production, there's now a Super Tumblast model to bring you super savings in cleaning costs through increased productivity and automation.

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## The Iron Age

Dr. Robert G. Breckenridge Director of research at National Carbon Co.'s Parma, O., laboratories, he guides 150 scientists in their quest for better conductors of electricity. The Bureau of Standards was his proving ground.

It is permissible for a scientist to have one foot on the ground and the other in the clouds. But when both feet leave the ground he must be brought back to earth. It takes something of a level-headed wizard, a super diplomat and an authoritarian to do the retrieving.

Such is the task of Dr. Robert G. Breckenridge, director of National Carbon Co.'s Parma, O., research laboratory. Under his guidance, 150 scientists are carrying out basic studies in solid state and chemical physics. Their combined efforts are uncovering new information on the electrical properties of such materials as intermetallic compounds, refractory hard metals, carbon and graphite, and electrolytic battery systems.

Dr. Breckenridge's interest in the electrical properties of matter dates back to his undergraduate days at Cornell University where he earned his B.S. and M.S. in chemistry. He went on to Massachusetts Institute of Technology for his Ph.D.

At the outset of World War II, he was working in MIT's laboratory for insulation research. Following the war he remained to teach for two years, then joined the staff of the U. S. Bureau of Standards. As chief of the solid state physics section, his scientific curiosity turned from insulators to conductors.

During 1953 he was loaned out by the Bureau of Standards to the Office of Naval Research, where he served as chief of the physics branch. In 1955, the year he joined National Carbon, Dr. Breckenridge was named chairman of the National Research Conference on Electrical Insulation.

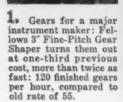
To Dr. Breckenridge, the unknown offers an irresistible challenge. And when he goes in search of the answer to a problem, his enthusiasm has a way of rubbing off on his colleagues. Keeping their efforts coordinated is then his primary concern.

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Robert Logie, named executive vice president, Firth Sterling, Inc., Pittsburgh.

Elmer F. Harris, appointed director, Production Planning Div., Tennessee Coal & Iron Div., U. S. Steel Corp., Birmingham, Ala.

John G. Munson, Jr., named division superintendent, Fairfield Steel Works; Jerome A. Winston, named staff assistant to vice president, operations, all plants; Augustus Cook, named general superintendent, Bessemer Rolling Mill, Tennessee Coal & Iron Div., U. S. Steel Corp., Birmingham, Ala.

Kenneth G. Hunt, named superintendent, construction and shops, Crucible Steel Co. of America, Midland (Pa.) Works; William H. McBurney, named supervisor, Plant Protection Dept.

Wilbur R. Shook, named treasurer, Worthington Corp., New York. W. Earle Black, named resident engineer, Pittsburgh Works, Jones & Laughlin Steel Corp.

Richard C. Slater, named manager, worksaver and warehouser sales, Yale Materials Handling Div., The Yale & Towne Manufacturing Co., Philadelphia.

Herbert R. Aronoff, named district manager, Houston, Texas, office, Luria Brothers and Co., Inc.

Sergio F. Tomassini, named European representative, Farrel-Birmingham Co., Inc., Ansonia, Conn.

William Rainey, appointed manager, new product development, W-S Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

William J. Meyer, named asst. sales manager, "Automatic" Sprinkler Corp. of America, Youngstown, O.

James MacCracken Adair, named sales manager, Dynamatic Div., Eaton Manufacturing Co., Kenosha, Wis.

Richard A. Schram, appointed asst. sales manager, aircraft bearing products, Shafer Bearing Div., Chain Belt Co.

Harold Horn, named district sales engineer, New York office, Thermal Research and Engineering Corp., Conshohocken, Pa.



FRED S. VAN VALKENBURG, named chairman of the board, The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.



A. DALE MITCHELL, elected president, The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.



JOSEPH L. KANE, elected vice president, Kennametal Inc., Latrobe,



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Francis H. Wickline, appointed assistant chief engineer, National Tube Div., U. S. Steel Corp., Pittsburgh.

Robert A. Nunlist, named asst. treasurer and credit manager, Armco Steel Corp., Middletown, O.; Robert S. Hayden, appointed asst. treasurer, corporate insurance and real estate.

Vernon L. Loofboro, named general manager, Gardner Machine Co., Beloit, Wis.; William Kissinger, named plant manager; John McLaughlin, named machine shop superintendent; Philip Allen. named assistant manager, Abrasive Dept.

John Mourer, appointed assistant general manager, Gardner Machine Co., Beloit, Wis.

Dr. Howard R. Spendelow, Jr., named manager, patents and licenses, Electro Metallurgical Co., Div. of Union Carbide and Carbon Corp.

Kenneth F. Waggener, appointed asst. superintendent, Bessemer Converter mill, Youngstown district, Republic Steel Corp.

Harvey W. Seymour, appointed general manager, Page Steel and Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Bruce R. Burket, named sales representative, Albion Malleable Iron Co.

James J. Hoffer, appointed marketing director, U. S. Industries, Inc., New York.

Robert Appleby, appointed managing director, The Black & Decker Manufacturing Co.'s Harmondsworth, England, subsidiary.



R. E. PRICE, named vice president and asst. general manager, Landis Tool Co., Waynesboro, Pa.



S. STUNEY MINAULT, elected vice president, National Research Corp., Cambridge, Mass.



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A. Parts are produced primarily by forcing metal into the desired shape rather than by "removing" or "machining" it. It is far faster...saves tremendously in time and labor.

B. The amount of metal in the initial slug, shot, billet, sheet, etc., is only slightly more than the total amount in the finished piece. Thus scrap and machining are held to an absolute minimum.

Metalworking plants casting about for ways to reduce production costs are turning more and more to the newer methods of forging, drawing and extruding in which metal is being "pushed around" rather than "removed." These processes basically are the hot extrusion of alloy steel, cold "pressure" forging of aluminum, cold extrusion of steel, and high pressure closed die extruding of aluminum and other non-ferrous alloys. Also falling within this category



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Cold steel extrusion reduced scrap 43%.



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- $2^{\text{Pieces}}$  generally have superior finish and improved physicals including grain structure.
- 3. Tolerances and uniformity equal or better those of older methods.
- 4. Scrap is greatly reduced and in many cases practically eliminated.
- 5. Unit costs go way down.

# REMOVINGit!

are somewhat older though greatly changed and improved methods for the extrusion of aluminum, hot forging of ferrous metals, powder metallurgy, deep drawing of sheet and die casting. The most recent developments involve variations and combinations of the above applied to many products and materials. Our engineers are in close daily contact with these developments. They'll be glad to help apply any of them to your production. Call or write us.



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Non-ferrous extrusion installations now embrace titanium, magnesium and newer metals.



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When this advertisement first appeared several years ago, it apparently sparked the current recognition of the "Move Metal" idea. Today the practice is widely accepted, acclaimed and growing. As the leader in the movement, Lake Erie will gladly share its experience with you.

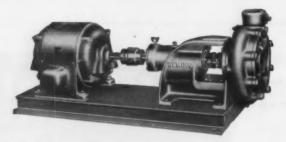
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Deming Fig. 4011 Centrifugal Pump delivers 180° caustic solution at rate of 100 g.p.m. against 46-foot head for degreasing trays of hand tools.



Same load of hand tools is rinsed in wash water tank served by another Deming Fig. 4011 Centrifugal Pump at 100 g.p.m. against 46-foot head.



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Optional features of Fig. 4011 make it readily and economically adaptable for handling a wide variety of liquids, including many corrosive materials.

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Louis C. Lundstrom, named director, General Motors Proving Grounds, Detroit.

Joseph J. Murray, named manager, New York industrial lift truck sales and service branch, Yale Materials Handling Div., The Yale & Towne Manufacturing Co., Philadelphia.

H. Thomas Hallowell, Jr., president, Standard Pressed Steel Co., Jenkintown, Pa., has been reelected president, American Standards Assn.

Francis J. Myers and Walter G. Crusberg, named district managers, iron ore mines, Adirondacks at Mineville and Lyon Mountain, New York, Republic Steel Corp.

Howard W. Galloway, named general sales manager, Elevator Div., Westinghouse Electric Corp., Jersey City, N. J.

William W. Keitch, named general manager, Vibration Div., The MB Manufacturing Co., Div. of Textron, Inc., New Haven, Conn.

Jack E. Saxer, named asst. chief industrial engineer, methods & standards, Jones & Laughlin Steel Corp., Pittsburgh.

H. Dean Wolfe, named district representative, construction materials, southwestern sales district. General Electric, Bridgeport, Conn.

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James Wood-after the War of 1812-developed a better "planished iron" than existed—and so began Alan Wood Steel. His son developed the first 3-high mill in the country, known as the Conshohocken Mill. Later there came the first 30" hot rolled strip mill in Eastern Pennsylvania-and the first water-treatment plant of its type in the industry-and the first rotary hearth furnace ever used for a plate mill operationresulting in scores of products, new and improved. The pioneering continues, true to the standard established by James Wood in his own words well over a hundred years ago . . . "Lots of trouble to get good product."

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to Bore Holes Faster than Ever Before

With the new LeBlond-Carlstedt Rapid Borer, you can bore, trepan or counterbore holes 3 to 8 times faster than by the conventional D-bit method!

The Rapid Borer was developed expressly to accommodate revolutionary new tooling which cuts at very high speed with good accuracy and finish.

Cutting oil is forced between the boring bar and hole wall forming a continuous bearing. It flushes back through a hole in the boring head and bar, carrying away the chips as it goes. Chip form is controlled both by tool angles and proper feed and speed combinations; thus tool faces are kept clean and chip passage clear.

Cutter design produces balanced cutting pressures thereby controlling concentricity.

This new tooling requires a machine with the following characteristics, all of which are incorporated in the LeBlond Rapid Borer design:

High spindle horsepower

Ample rigidity throughout

Complete absence of vibration at all speeds

Infinitely-variable feeds (up to 38" per minute),
independent of speeds, while running under load

Final drive to spindle through belts

Large volume of cutting oil

Basically, the Rapid Borer is suited to work that is symmetrical for balance in rotation—round, square, octagonal, tapered or stepped. A wide variety of hole diameters and depths as well as work sizes can be accommodated.

Tell us about the holes you'd like to produce faster. Large holes or small. If the Rapid Borer can handle the job, we'll show you how to produce them faster than ever before.



#### BRIEF SPECIFICATIONS, No. 30 RAPID BORER

Workpiece diameter	34" to 611/16"
Boring and workpiece lengths (max.)	
Solid boring	1/2" to 11/4"

Trepanning or counterboring	2¾" max.
Spindle speeds	Single speed or variable to 2500 rpm
Main drive motor	30 hp

#### EXAMPLES OF WORK BORED IN OUR SHOP

1. Drive Shaft, 29½ " x 2½"
Blind hole, 25" deep, .887" dia.
Material, 4140
Penetration rate, 6½ "/min.
Floor-to-floor, 5.5 minutes
Old method\* floor-to-floor, 29.2 min.

\* Old method-conventional D-bit

2. Barstock, 131/6" x 25/6"
Through hole, 1.062" dia.
Material, C1141
Penetration rate, 71/4"/min.
Floor-to-floor, 3.2 min.
Old method\* floor-to-floor, 19.4 min.

3. Barstock, 101% x 21/4"
Through hole, .775" dia.
Material, C1141
Penetration rate, 7"/min.
Floor-to-floor, 3.03 min.
Old method\* floor-to-floor, 14 min.

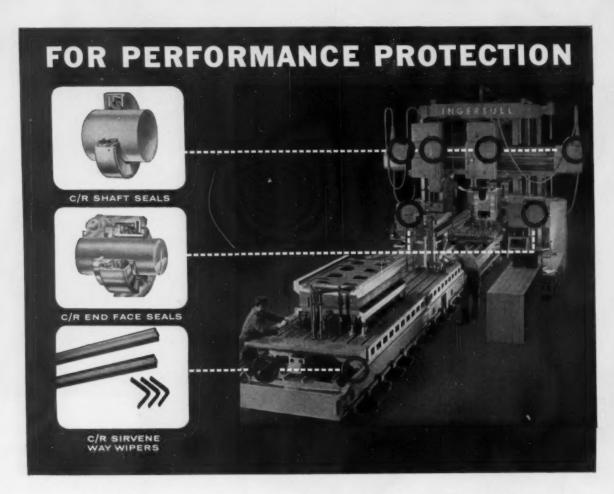
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For the fabricator-

## New Heat Treatments Improve Beryllium Copper

- Beryflium copper has undergone a number of significant changes in recent years . . . Composition has been altered to conserve beryllium, simplify machining and forming.
- ♦ New heat treatments require different aging times and temperatures . . . But the net result is an overall superior material . . . Other advantages include improved strength, better conductivity and resistance to fatigue.

By J. T. RICHARDS, Chief Engineer, Penn Precision Products, Inc., Reading, Pa. ◆ RECENT improvements in the alloying of beryllium copper now provide fabricators with a more dependable and easier-to-work-with material.

Most important to the fabricator is the fact that the newer beryllium copper is far less of a problem to handle. What's more, its response to heat treatment is dependably uniform—no longer erratic.

When beryllium copper was introduced to the U. S. in 1931, it contained essentially 2½ pct beryllium, balance copper. This composition resulted from prior experimental work in Germany. Produced on a laboratory scale, this analysis offered an interesting combination of properties.

But transition from laboratory to production was not easily accomplished. Frequently encountered variations in structure, analysis and quality—although a challenge to the metallurgist—were a headache to the fabricator.

Practical experience eventually produced a series of modifications. It was found that binary beryllium copper was highly susceptible

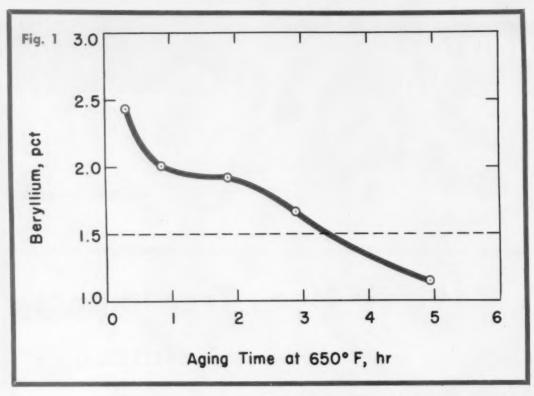


FIG. I—Berytlium content vs aging time required to produce maximum strength in annealed strip.

to variations in hardness response, so that various aging treatments might be required for two ends of the same coil to achieve maximum hardness. This was due largely to uneven distribution of the precipitating phase, frequently found concentrated at the grain boundaries.

Adequate control of grain size was difficult during mill annealing or solution treating. After considerable experimentation, it was found that small amouts of nickel or cobalt would not only stabilize response to heat treatment but would also retard grain growth during annealing.

#### Solve production kinks

Fabricators engaged in machining, stamping, or drawing beryllium copper mill products ran into severe production problems. As beryllium content was increased, hardness improved but fabricating became more difficult due to formation of extremely hard and abrasive beta phase.

This condition was further aggravated by the introduction of additive elements. Such additions caused a decrease in the solubility of beryllium in copper, increasing the amount of undesirable beta phase.

Only answer was a reduction in beryllium

content. This decrease has been gradual, reaching 2½ pct in the late Thirties, 2 pct during World War II, and finally 1.9 pct in 1951. Improvements in mill techniques were required to avoid a lowering of property limits. The decrease in beryllium content also reduced alloying costs.

Due to these changes, modifications in aging time and temperature were required. It became mandatory to increase either aging time or temperature. Since reaction rate may become extremely slow at low temperatures, it was preferable to raise aging temperature. Recommended temperature for producing maximum properties was raised from 570° to 600°F when beryllium content was dropped to 2 pct.

Conformance with the new beryllium limits has been slow. Only recently has strip approached the 1.80 pct beryllium minimum. Coupled with this, some quality improvement has resulted from a reduction in impurities. Gradual decreases in iron, silicon, and aluminum have influenced aging characteristics.

A test program covering beryllium copper was initiated at Penn Precision Products several years ago. An important part of the program was devoted to heat treatment.

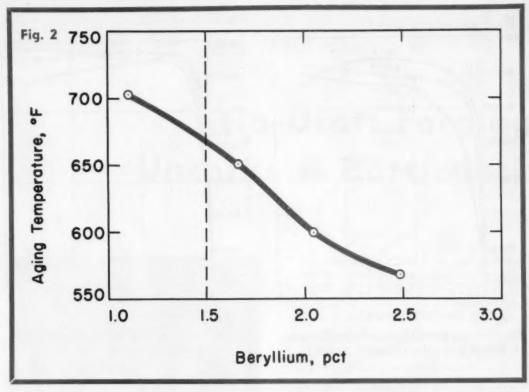


FIG. 2—Effects of temperature and beryllium content in a 3-hour heat treating cycle.

The effect of beryllium content on aging time and aging temperature is shown in Figs. 1 and 2. A decrease in beryllium requires an increase in aging time, temperature or both. For a given beryllium analysis, reduction of impurity content has the same effect but in lesser degree.

When beryllium content is less than 1.5 pct, aging under normal conditions does not produce significant hardening—even with prolonged heating. For this reason, other elements capable of accelerating reaction rate are essential. A typical example is the addition of 1-3 pct zinc and tin to Alloy 115. This material contains only 1.10 pct beryllium. Standard heat treating recommendations specify 2 to 3 hours

at aging temperature (600°F), since this time range is usually best for the average fabricator of beryllium copper. With shorter times at higher aging temperatures, control of these variables is more critical. "Mass effect" with large furnace charges may become a problem.

On the other hand, heat treating cycles of more than 3 hours are not desirable because of increased costs and lower production rates.

Effect of aging temperature on the tensile strength within the 2 to 3 hour time range is shown in Figs. 3 and 4. Fig. 3 applies to solution treated strip, while Fig. 4 covers half-hard material.

It is apparent that the 600°F treatment is no

Table 1	Old an	Old and New Heat Treating Cycles To Produce Maximum Strength in Beryllium Copper St					
Temper		Designation	Old Treatment*	New Treatment			
Solution Treated (	(soft)	A	3 hr at 600° F	3 hr at 650° F			
Quarter Hard		1/4 H	21/2 hr at 600° F	3 hr at 625° F			
Haif Hard		1/2 H	2 hr at 600° F	2 hr at 625° F			
Hard		н	2 hr at 600° F	2 hr at 625° F			

\* In accordance with Specifications: ASTM B-194 and Federal QQ-C-533



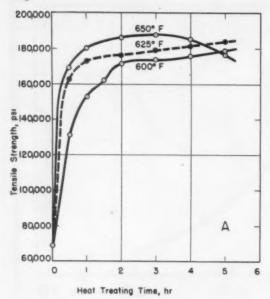


FIG. 3—Aging curves for annealed beryllium copper strip at temperatures from 600° to 650°F.



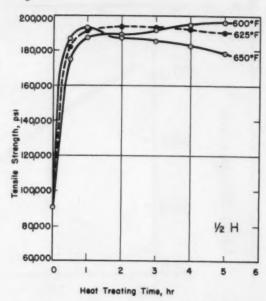


FIG. 4—Aging curves for half-hard beryllium copper strip at three temperature levels.

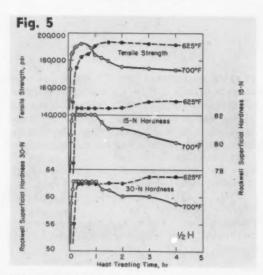


FIG. 5—Hardness response curves for half-hard beryllium copper strip 0.020 in. thick.

longer applicable, since it does not produce maximum properties within a reasonable aging period. Optimum strength for solution treated strip is attained only with hardening times over 8 hours.

On the basis of similar curves, new aging treatments have been developed for the four commercial tempers of beryllium copper strip. These new treatments are summarized in Table 1 along with the cycles they replace. Note that the recommendations apply to Alloy 165 (1.7 pct Be) and the standard Alloy 25 (1.9 pct Be).

The same factors which led to revision of the 600°F aging curves also affect other aging temperatures. To produce special properties and impart the degree of stress relief necessary for fixture hardening, aging at 700°F is frequently specified.

#### Improve formability

The hardening response at 625° and 700°F for half-hard strip is compared in Fig. 5. A limitation of the hardness test as an inspection tool is apparent, since hardness reaches a peak at a time that produces "over-aging" or some loss of tensile strength.

Better ductility and formability are among the important advantages gained from reductions in beryllium and impurity contents. Fabricating qualities such as deep drawing and machining are also improved.

It is important to make use of the higher aging temperatures to insure maximum strength, hardness, and resistance to fatigue.

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### No-Draft Forging Uncorks A Bottleneck



ALUMINUM NO-DRAFTS are produced in volume on hydraulic presses like this 8000-ton unit.

- Aluminum forgings play a big part in airframe production... Draft angles required for removal from dies have been a drawback... You could take them off afterward by expensive machining or leave them—and lose in airframe efficiency.
- ♦ No-draft forgings offer a third way . . . At Harvey Aluminum, military and commercial forgings are produced draft-free and in volume . . . Result: airframe machining bottlenecks are eliminated; less manpower, material is required.

By R. R. KAY, West Coast Editor

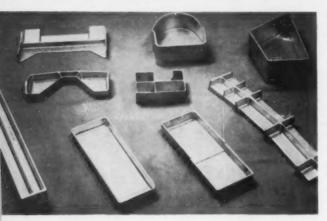
♦ ALUMINUM NO-DRAFT forgings offer three distinct advantages over their more conventional (draft-including) counterparts. Because parts emerge from forging either ready to use or very close to it, they reduce or eliminate subsequent machining. At the same time, they reduce both material and manpower required.

For the past several years, information on production and design of aluminum no-drafts has been carefully shrouded. Currently, most no-draft forgings are finding use as structural fittings in airframe manufacturing. Many forgings considered impossible to make a year ago are today in full production.

#### Commercial possibilities

No-drafts appear equally promising for commercial applications. No-drafts can find volume use today in transportation machinery in, for example, piston-type parts. Textile machine parts and instrument components are other applications.

A pioneer in the draftless forging technique has been Harvey Aluminum, Torrance, Calif. Its experience to date sheds considerable light on factors of importance in turning out aluminum no-drafts.



TYPICAL of draftless forgings turned out on production basis by Harvey are these parts.

The term no-draft indicates a zero degree angle measured from a side of the forging to the perpendicular of the forging plane. The big objection to the draft angle normally included in forging dies to simplify forging removal has always been that the metal contained within such a draft angle cuts down on the efficiency of a section.

This has been especially important in airframe applications. As forgings gain in size, the excess weight of this metal has to be eliminated, either in the forging process or in a secondary, machining operation.

#### Machining equipment's limited

Machining is, of course, costly. In addition. there's the limitation of equipment needed to machine large forgings. There's just not enough machining equipment to produce the volume of aircraft forgings required. Another drawback is that machining interrupts the flow lines of a forging, resulting in a loss of desirable grain flow characteristics.

The alternative to machining (and hence its importance) is no-draft forging.

Volume production of aluminum no-drafts calls for a careful blending of many factors. Modern equipment, close temperature control, proper lubrication all figure in. Die design and engineering skill, as well as production personnel with extensive press-forging experience, are all important. Craftsmanship standards are among the highest in metalworking.

Aluminum no-drafts are usually made on hydraulic forging presses. Modern presses include ejector mechanisms to free forgings from the die impressions. These, with improved die design and die-sinking techniques, are enabling fabricators to produce the most advanced kinds of aluminum no-drafts.

Harvey's 8000-ton hydraulic unit is typical of the presses used for producing large nodraft forgings.

Standing over 50 feet tall, this press is equipped with top and bottom ejector mechanisms; has an effective die bed of 110 by 80 in. Press stroke is 72 in. and the daylight is 110 in. Built extra-sturdily, this press restricts full-load deflection to a minimum and accommodates complex unsymmetrical forgings.

Such secondary equipment as trim presses, straightening presses, modern pre-heating furnaces, etc., are also needed for a well-integrated operation.

For forging stock, Harvey calls on its own extensive extrusion facility. Here, any shape most advantageous for the production of a particular forging can be readily produced. To insure maximum quality of this stock, logs cast in the ingot plant and slated for forging production are subjected to ultrasonic and penetrant inspection for both internal, external flaws.

Aluminum slugs, sawed from rod, bar or billet, are preheated in carefully-temperaturecontrolled furnaces prior to forging.

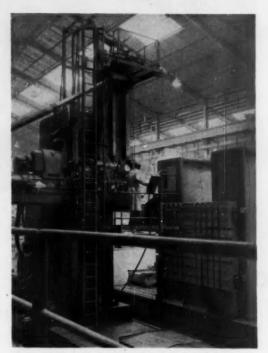
Special blocking and finishing dies, also requiring exacting temperature control, are used in fabricating no-draft forgings. Number of dies used depends on the complexity of the particular part being forged. Blocking dies preform the general shape of the forging and work the metal to give it desired directional characteristics.

In the finishing operations, the preformed metal is placed inside the bottom die and the top die presses down to squeeze the metal to proper finished dimensions. To obtain correct metal flow and avoid internal defects, blocking and finishing dies require precise accuracy during designing and tooling stages.

Some or all of the other progressive forging operations are applicable as well to aluminum no-drafts. These would depend on the particular part and its application.



ULTRASONIC TESTER automatically inspects material for presence of internal discontinuities.



GIANT DIE-SINKER roughs out forging dies, either tracing from model or acting independently.

Included here would be trimming, to remove excess metal from the finished forging; heat-treating, to fully develop mechanical properties; straightening, to achieve strict tolerances, and controlled etching to clean the work.

All no-draft forgings get a final inspection which is more detailed than usual, because of the close dimensional tolerances. Visual surface examination techniques include dye penetrant inspection, dimensional checks and testing for internal defects using the immersion ultrasonic technique.

Proper lubrication is an important factor that can influence the quality and finish of a no-draft forging. Ordinary graphitic lubricants are satisfactory for simple parts. For complex designs, special lubricants which do not break down at high temperatures must be employed. In Harvey's case, a continuing research program to develop improved lubricants is conducted.

Tooling is a vital key to the successful production of no-draft forgings. Only alloy steels capable of withstanding the high service loads imposed can be used. A considerable increase in engineering time is usually required. Inserted or segmented dies are usually needed, and take more construction time.

There's considerable skill involved in coordinating the design possibilities of no-drafts with the production capabilities of the latest forging equipment.

In designing for the average no-draft, fillet

#### **No-Draft Design Permits:**

Reduced fillet and corner radii
Thinner webs, ribs
Closely controlled mismatch
Greater adjacent-area thickness variations
Much greater ratio of leg or stiffener
height to web thickness

radii and corner radii are reduced, webs and rails are thinner, mismatch is closely controlled and greater variations in adjacent areas are permitted. Also, ratio of leg or stiffener height to web thickness can be much greater.

Size of no-drafts is directly dependent on press equipment and die-sinking capacities. The die bed on an 8000-ton hydraulic press will readily accommodate most of the commercial and military applications of aluminum no-draft forgings being designed today. Depending on complexity of shape, from 200 to 500 sq in. of plan area is most practical now for big commercial applications.

Tolerances exercise the most control over the economics of producing aluminum no-draft forgings. Newer-type equipment makes closer tolerances possible.

#### Needn't be 'precision' parts

For the airframe manufacturer, tolerances in no-drafts are continually being marked for improvement. In contrast to the finality achieved with zero-degree draft angles, tolerances are capable of and demand continuous refinements to meet the continually more exacting requirements of airframe construction.

In commercial applications, many designers mistakenly believe that a no-draft forging must necessarily be a precision forging. Some designers and engineers are incorporating a zero-degree draft angle to avoid major machining, but are designing to commercial tolerances to gain better economies.

These broader tolerances permit forging producers to decrease tooling and production costs, lead time and engineering time. Designers are also planning no-drafts with only a portion of the part held to close tolerances.

Most no-draft forgings today are a redesign of conventional forgings and castings in an effort to gain no-draft advantages.

Progress of no-draft forgings is geared to better equipment and newer techniques. But equally important is the development of materials with better physical and mechanical properties. Aluminum alloys used today for no-drafts include 2014, 6061, 6066, 7075, and 7079.

## Handle Chips Efficiently



Cleveland Crane & Engineering Co

MONORAIL-MOUNTED, this magnet picks up chips, turnings in tunnel, carts them to storage bin.

#### For Greater Shop Profits

Efficient handling of chips and turnings can build up some impressive savings . . . There's a rash of handling and processing equipment and techniques to help do this . . . Today's crushers, for example, permit shipping turnings in one-third the space they'd otherwise take.

 Such devices play an increasingly important role... Here's how conveyorized magnets, crushers and other devices are being used effectively in many chip-producing shops and plants.

By J. E. HYLER, Consultant, Peoria, III.

Part II

♦ INEFFICIENT HANDLING of chips and turnings costs money. Increasing recognition of this fact has led to development of a rash of equipments and techniques for removing and processing such scrap more effectively. Among these, chip crushers and oil extractors have come to play a more and more important role.

Such processing where volume of material handled justifies its use, means the compacted material can be handled and shipped more cheaply. Extractors recover cutting oil otherwise lost and result in better scrap prices being obtained. There are other advantages.

In many plants management has elected neither to crush chips nor extract oil. Economical handling then requires only removal of chips direct to disposal points.

An effective method for taking out such material has been magnets mounted on monorail carriers. One plant which handles a carload of such metal chips and shavings daily has installed such carriers in two parallel tunnels excavated in the ground below the plant. Magnets shuttle back and forth automatically over the monorails, picking up chips and turnings. Tunnels are located so that chips can be readily shunted to them from machines above.

Material thus gathered is carried over a long

distance for disposal in chip storage bins.

The arrangement of this gathering system is relatively simple. Power to the magnets is "Off" when they are "dead heading" away from the bin and toward the machines; "On" when they reverse their travel to pick up accumulated scrap. When they reach position over the bin, power cuts off and the accumulated chips and turnings drop off.

Some cases call for portable bins. Spotted as close as possible to the machines they're clearing, these are generally big enough too so that only a once-per-shift removal and dumping, sometimes even less frequent, is sufficient.

In plants where crusher installations are used, cast iron and steel chips are usually kept separate. This is partly because cast iron chips require no crushing, partly because they often command a higher price. In some instances, ferrous chips may become mixed with those of some nonferrous material. Here magnetic separators can be employed.

Steel chips and shavings are often fed through a grated opening in the floor, leading to the crusher below. Sometimes an operator may work chips from a preliminary receiving bin onto a flight—or belt-conveyor at a constant rate. Where this is done, the same operator usually removes any stray parts, bar ends or other foreign matter.

#### Usually crush chips first

With such setups the conveyor usually carries chips and turnings into a hopper facing the crusher. Routing is first through the crusher, thence to the oil extractor. Cast iron chips which require no crushing obviously are conveyed direct to the extractor instead.

Chips put through both steps usually feed from the crusher into an oily bin. They are then drawn from the bin at need to feed the extractor. Sometimes finished bars and small bar ends are allowed to feed directly through the crusher without preliminary separating. Where this is done, though—even where they cause no serious damage—they create excessive wear on the machine. Also, too many such parts reduce the scrap's market value.

There's a considerable difference between various metal chip crushers on the market. Some—designed to break chips to one-half to one-inch size, will process 2000 lb per hour, and have a 12 x 12 in. hopper size. These discharge directly into a bin or container or to a conveyor. They simply require that material be thrown or fed into the hopper.

Crushers are available which will reduce turnings to short shoveling lengths, easy to handle and store. These reduce actual bulk anywhere from 50 to 80 pct, allowing much more to be stored in a given bin or shipped in a given car. However, the same machines will reduce them to a much finer state, suitable for briquetting where that is desired.

Crushed turnings generally ship in about one-

third the space, for any given volume by weight, of uncrushed turnings.

Some excellent crushers reduce the turnings primarily by hammer impact, then carry turnings between crushing elements and a series of radially-disposed grate bars for further reduction. Crusher speed and grate bar spacing determines degree of reduction.

Pear-shaped elements which do the actual crushing are double-edged, made of manganese steel, and are faced with the best wear-resisting metals. Manganese steel liners are also employed. Some large crushers feed directly from clamshell buckets or magnets.

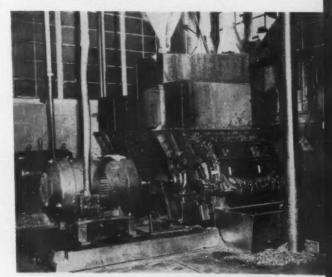
#### Primary crushers sometimes help

Where exceptionally large volume is handled, a primary crusher is sometimes employed to reduce turnings to lengths from 4 to 12 in. at an exceedingly high rate. Conveyors then can feed it to secondary crushers if desired. Sometimes special elongated-conveyor feeds "comb out" turnings beneath steel fingers.

A second toothed conveyor at the top, hinged and weighted, compresses turnings before they are torn apart and discharged into the crusher. The uniform feed provided increases capacity greatly and eliminates the expense of hand feeding. An arrangement permits excess oil from turnings to drain through the conveyor into a pan for reclamation.

Some steel turnings crushers now carry special reversible shredder rings equipped with 20 cutting edges. These are staggered to cover the entire width of the machine. Held to their outward position by centrifugal force, these reduce chiefly by impact rather than sharpness.

Any tramp metal entering these machines automatically passes out the rear, beneath a counter-weighted swinging door.



American Pulverizer Co.

INSTALLED in bearing plant, these two crushers reduce an average 1250 tons of turnings per month.

### Carbide-Tooled Lathe Threads Tough Alloys Easily

By C. V. JOECKEN, Tool Engineer, The Lees-Bradner Co., Cleveland

- ◆ Producers of high strength pipe and couplings have a problem: threading these parts with precision, speed and economy . . . One answer could be this quick-setup lathe which features single point carbide tooling.
- ◆ INCREASING DEMAND from the petroleum industry for higher tensile strength pipe and couplings poses a problem for producers of these components: how to thread them quickly, accurately and economically.

Single point carbide tooling in a rugged, automatic thread-cutting lathe is the solution offered by the Lees-Bradner Co., Cleveland machine tool builder. Firm is the U. S. distributor for the British-built Cri-Dan lathe, recently demonstrated its fast-threading features for

Lathe is automatic, can thread toward headstock or tailstock . . . Threading tool is carried in a boring bar, works in conjunction with a rotating chip cutter . . . Machine holds Class 3 tolerances, adapts to long or short runs.

leading producers of American Petroleum Institute pipe couplings.

Machine, in appearance and operation, is quite similar to a conventional screw-cutting lathe. However, tool movements of the Cri-Dan unit are automatically controlled by a precision, drum-type lead cam which replaces the usual lead screw.

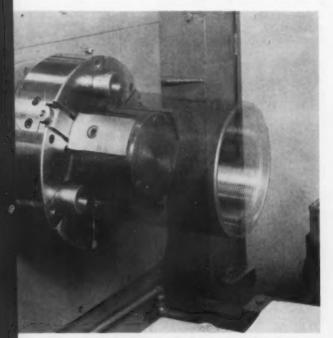
The threading tool is cam-controlled to feed into the work at the beginning of the cycle and also to retract at the end of the cycle. The tool feeds to a predetermined increased depth on each pass until required depth is achieved. Conventional setup threads parts toward the headstock, however for more efficient chip removal in internal threading, the machine can thread toward the tailstock.

#### Grind profile in carbide

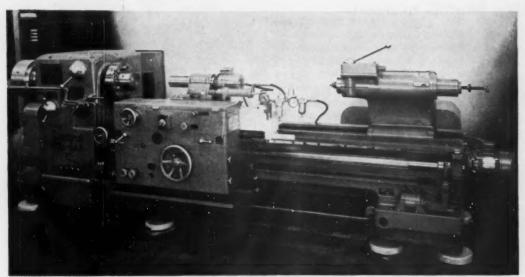
To produce threads in high strength material, a thread profile is ground onto a carbide tipped tool or a solid carbide blank. This can be done with a conventional carbide grinder. Profile can also be lapped by a Cri-Dan Profilap machine, a companion unit to the threading lathe.

The profiling machine has two hardened lapping drums mounted on a double ended shaft. Concentric grooves on the drums correspond to the thread-form profile. Drums rotate through a mixture of boron carbide and olive oil. The roughing operation uses 320-grit boron carbide; the finish lap uses 600-grit material.

The machine roughs a normal 8-pitch API tool in approximately 12 minutes, and finishes the tool in about 6 minutes. However, the lapper requires no attention while it is operating, and a timer can be set to shut it off after either the roughing or finishing cycle. During this



PHANTOM view illustrates how an API coupling is gripped in three-jaw, wedge-type air chuck.



LATHE setup for fast threading features fast-traversing tool block driven by air cylinder.

time, the operator can perform other duties, such as running the actual threading lathe. The lapping machine can also refinish worn tools.

Tooling setup for threading an 8-thread-perin. API coupling consists of: (1) a three-jaw, air-operated, wedge-type chuck to hold the coupling; (2) the threading tool, mounted in a boring bar which is supported by an airoperated, retractable tool block. Rapid longitudinal movement of the air-driven tool block aids work loading and unloading.

For a threading operation the tool block is advanced its full limit toward the headstock and is then manually clamped. As shown in an accompanying photo, a unique motor-driven chip cutter rotates within the boring barthreading tool unit. Chips pass over the threading tool into the path of the cutter blade which cuts them into short lengths for easy removal. With the machine fixed to thread toward the tail stock, chips are pulled toward the mouth of the coupling.

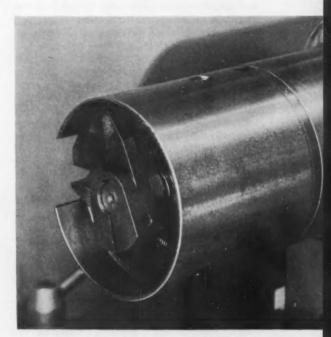
#### Two-point tool is faster

For the practical demonstration, the lathe was set up to machine two 8-thread-per-in. sections, each extending in about  $4\frac{1}{4}$  in. from the ends of a long coupling of 7-in. size. The single point tool threaded each end in 4 minutes, 15 seconds but used at least a third of the time to remove excess stock from tops of threads. Time could presumably be cut to 2 minutes, 15 seconds by first boring the part to within 0.020 in. of required thread bore. A two-point carbide tipped tool, which can be produced economically on the Profilap unit, could thread each end in an estimated 71 seconds.

Also machined was a long coupling of 7-in. size which requires a 5-thread-per-in., 34-in.-

taper-per-ft, API buttress casing thread. The single point tool threaded each end in 2 minutes, 20 seconds, taking four passes to remove excess material. Holding the original bore to within 0.020 in. of required size would permit doing each end in 1 minute, 48 seconds.

Single point threading by this technique combines versatility, ease of setup, short cycle times and ability to hold Class 3 thread tolerances. Result is economical and consistently good parts from either long or short runs.



CHIPS from the threading tool are directed into the path of rotary chip cutter in boring bar.

## Two-Step Process Retards White Rust

- ◆ A fresh approach to the old problem of white rust on galvanized steel offers new hope for its eventual control . . . A two-dip treatment strikes directly at the heart of the trouble: water and condensed moisture.
- ◆ First step calls for formation of a relatively stable, water-repellent film on the galvanized surface . . . A second dip in a chromic-type solution improves this protection . . . Processed correctly, the treated surface remains free of white rust.

By L. J. BROWN, Research Chemist, Pennsylvania Solt Mfg. Co., Wyndmoor, Pa.

♦ WHITE RUST, it's generally agreed, constitutes a most annoying problem to those producing, handling, storing and using galvanized sheet. This white corrosion product, often called "humid storage stain," generally occurs on galvanized steel in storage or in transit. It can turn the bright, spangled, galvanized surface into a dull gray, unsightly sheet of decreased customer appeal.

A new treatment developed in the laboratories of Pennsalt Chemicals presents a fresh approach to solution of this problem. It involves first creation of a water repellent film on the cleaned galvanized surface. Immersion in a chromic-type bath then develops corrosion inhibiting properties in the film. Together the two solutions, properly applied, impart a relatively high degree of resistance to formation of white rust.

Temperature fluctuation as well as actual wetting by rain or other means are believed to encourage this white rust condition. The first causes moisture to condense on or in a stack of galvanized sheets. On wetting the edges of stacks or coils, water may penetrate far into the interior. Either or both circumstances set the stage for the ensuing corrosion and drying that leave undesired cloudy areas or blotches of white corrosion product.

Treatment of finished galvanized steel to overcome this defect is very important to the industry. Most current treatments involve use of chromates, well known as corrosion inhibitors. One important patented process' is a combination silicate-dichromate treatment. Others employ slightly acid baths.

Despite the obvious beneficial effect of chromates, complete success in prevention of humid storage stain has been difficult to attain in field applications. Unfortunately also, many such processes color, stain or etch the metal, and can materially change its appearance. Manufacturers desire the bright, galvanized surface to remain after treatment.

In the test series, galvanized steel was obtained from several sources. Specimens thus repre-

#### Table 1

Comparative Behavior of Water Repellent Films on Clean, Galvanized Steel

		Pct White Rue	it in 2 Cycles
Hydrophebic agent	Concentration in aqueous solution, grams per liter	Stack test	Water film tool
falty amine acetate*	1.2	none	80
fatty amine acetate*	0.6	none	80
sodium eleate	0.5	none	80
sodium steerate	0.8	nene	46

\* Hydrogenated tallow amine acetate. While other figtty amine acetates also are effective, this one was selected for most further work.

#### Table 2

#### Comparative Behavior of Fatty Amine-Chromic Films\* on Clean, Galvanized Steel

	A			
Source of galvanized epecimen	Active agent	Aqueous solution, concentration, g/liter	Pct White Rust after 3 cycles**	
A	propriotary chromic type rinse***	3	none	
A	K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	1	slight (< 5 pct)	
A	K <sub>2</sub> Cr <sub>2</sub> O <sub>2</sub>	1	hone to trace	
В	K2Cr2O7	1	5 pct	
A	K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	1	none to trace	
8	K2Cr2O7	1.	slight (< 5 pct)	
8	proprietary chromic type rinse***	1	nene	
A	CrO <sub>2</sub>	1	none	

\* Film developed by immersion in aquoous solution of fatty amine acotate of standard concentration followed immediately by the apprepriate after-rines.

\*\* Water film test.

 $\ensuremath{^{\circ\circ}}$  Fourines K is the proprietary chromis type rines noted throughout the article.

sented different manufacturers and various galvanizing processes. Panels 4 x 6 in. cut from these samples were inhibitively treated, then tested by several methods.

Among the specimens, some variation was noted in inherent corrosion resistance and in response to inhibitive treatment. No actual correlation of corrosion resistance with source of manufacturing procedure was attempted.

#### Tested four ways

Test methods for determining corrosion resistance of galvanized steel vary widely. Generally they involve a form of (1) a pressure cooker test, (2) a water film test, or (3) a condensation test. A representative of each test was employed in this work, and a fourth, the "stack test", was introduced.

Neish² describes both pressure cooker and water film tests. The pressure cooker test consists of exposing the specimen to the moist atmosphere created by raising cooker pressure to 10 psi  $(240\,^{\circ}\mathrm{F})$ , then removing the heat source and allowing pressure to subside over a period of thirty minutes.

The water film test was modified to test panels in stacks. Panels wet with distilled water were stacked then clamped between wooden blocks. Panels were examined at 24 to 48 hour intervals.

The stack test resembles the water film test except that panels were stacked dry, then clamped.

Finally, the stack was dipped into distilled water at 24 to 48 hour intervals.

In the condensation test, panels simply covered a shallow pan containing water heated initially to 70°-75°C. Panels remained in this position for several hours as the water cooled to ambient temperature.

In all these tests, cycles were repeated as necessary to demonstrate differences in corrosion resistance of panels treated by various means.

Test results revealed new information significant to galvanizers and users of galvanized steel. Certain cationic agents, it was found, produce strongly hydrophobic films on galvanized steel immersed in their dilute aqueous solutions. Such water repellent films protect galvanized steel against white rust in stack tests (Table I), even though they are not corrosion resistant as measured by water film tests. These water repellent agents include such organic compounds as the fatty amine acetates, as well as neutral oleates and stearates.

#### Get bright surface

Although all treatments shown in Table I performed quite efficiently in stack tests, only with the fatty amine acetates did the surface remain bright. The soap-type films (oleates, stearates) were very obvious.

Further experiments showed that films formed by such cationic agents, if subsequently rinsed in dilute chromic solutions, acquire considerable corrosion resistance while the hydrophobic character remains. Table II shows that such fatty amine-chromic films will resist at least three water film test cycles.

It is characteristic of fatty amine acetates that they are precipitated by most of the common anions. Therefore, deionized water is necessary both for solution preparation and replenishment.

Extraneous ions in the chromic rinse also prove important, as might be anticipated. Sulphates, chlorides and nitrates are known to be integral parts of some conversion coating processes. Such ions, when added to chromic-type rinses, all seem to modify the appearance or corrosion resistance conferred on the galvanized surface. Quite good corrosion resistance was obtained by one proprietary rinse alone, when prepared in distilled water (see Table III).

Table IV demonstrates the importance of the condition of the galvanized surface before treatment. On metal from at least three sources, significantly better resistance to white rust occurred if the panels were cleaned in an alkaline bath before treatment. On some samples, good resistance resulted when treatment was applied to the material as received.

Choice of test for determining corrosion resistance will influence the results, as can be seen from Table V. Panels treated in various ways were tested by all four methods described earlier.

Results obtained from three of the tests (condensation, water film and stack) exhibit fair agreement with one another. The stack test obviously favors panels bearing a hydrophobic film. The pressure cooker test favors the silicate-dichromate film, which apparently is not destroyed by the high temperature and pressure generated in the cooker.

Importance of cleaning again seems evident, especially in the water film and condensation tests. Significance of differences between the treatments necessarily depends on which test is considered in interpretation of the results.

The variety of tests used here and by other investigators indicates some doubt as to which one, if any, represents field conditions. It's entirely possible that each simulates certain conditions conducive to formation of white rust.

#### Significance of tests varies

The pressure cooker test appears least representative, since its conditions are probably never met in the field. The stack test represents only that condition which wets edges of the stack. This circumstance may be more important than generally recognized, especially after the product leaves the hands of the manufacturer.

Thus the hydrophobic film described previously becomes significant. When coupled with the reasonably good corrosion resistance conferred by a chromic after-rinse, the treatment becomes quite attractive. This even though some production difficulties still exist.

Necessary use of deionized water may seem to be a difficulty. But the fact remains that extraneous ions which color or etch the zinc coating are unwelcome in this application, even though corrosion resistance is good.

Cleaning is shown to be beneficial in these tests. But it may not be necessary in field applications. Age, handling and other factors may possibly be partly responsible for the differences found. Only actual field trials are apt to answer this question. In any event, good surface wetting in the initial dip is important. This holds true whether that first bath is of a fatty amine acetate or a chromic nature.

The corrosion protection previously described is believed at least partly due to the product of chemical reaction between the fatty amine acetate film and the chromic acid or dichromate. The continued hydrophobic character throughout the cycles indicates this. The film, in fact, is somewhat easier to remove with alkaline cleaners than the film produced by chromic acid alone. Moreover, immediate rinsing of the fatty aminechromic film does not destroy its protective ability. On immediate rinsing of a panel treated in chromic acid alone, little corrosion resistance remains.

#### REFERENCES

#### Table 3

Effect of Ionic Impurities\* on White Rust Inhibitive Treat-

Treatment	Specimen appearance**
chromic rinse in distilled water	trace white rust
etremic rinse in 75ppm Na;SO,	discolored
chremic rinse in 75ppm NaCl	5 pct white rust
chromic rinse in 75ppm CaCl <sub>2</sub>	18 pct white rust
chremic rinse in 75ppm MgSO <sub>4</sub>	disselored
chromic rines in 1 m1/1 nitric acid	loose yellow film
fatty amine-chromic in distilled water	excellent
fatty amine-chromic in 78ppm Na <sub>2</sub> 8O <sub>4</sub>	discolored
fatty amine-chromic in 75ppm NaCl	trace cloudy or etched

\* ions community found in hard water

\*\* after correcion teating

#### Table 4

Effect of Precleaning on Corresion Resistance of Treated Galvanized Steel

			Put Whit	n Runt
Test		Water f	llm	Condensation
Cycles		1	2	
Source	Treatment			
A	cleaned-proprietary rinse	nene te	-	-
A	not cleaned-preprietary rinse	65 pct	-	-
A	not cleaned-K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	75 pct	-	400
A	cleaned-K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	trace to slight	-	-
A	cleaned-fatty amine acetate- proprietary rinse	-	trace	-
A	not cleaned-fatty amine acetate- proprietary rinse	-	80 pct	-
В	cleaned-fatty amine acetale- proprietary rinse	-	nene to trace	slight
B	nst cleaned-fatty amine acetate- proprietary rines	-	10 pet	70 pct
c	cleaned-fatty amine acetate- proprietary rinse	-	neme	alight
C	not cleaned-fatty amine acetais- proprietary rines	ate	50 pct	25 pct

Neish, R. A., U.S. Patent 2,665,232 (1954)
 Neish, R. A., "Measurement of the Susceptibility of Galvanized Surfaces to Humid Storage Stain," Corrosion, vol 10, December 1954, p. 440

#### Table 5

Comparative Resistance to White Rust Imparted by Various Treatments\*

Test	Pressure cooker		Cendensal	Cendensation		Water film	
Number of cycles	1	2		10	1		
Treatment							
not cleaned—18 second dip in 3 g/1 pre- prietary rines at 70° C	80 pet	80 pet	elight to 5 pct	10 pct	28 pct	70 pet	8 pcl
cleaned—15 second dip in 3 g/1 proprietary rinse at 70° C	trass	alight to 6 pet	none to	trass	trace to elight	20 pet	8 to 10 pet
cleaned—15 second dip in 1 g/l faity amine acetate A at 60° C—then 15 second dip in 3 g/l proprietary riese at 70° C	none to	40 pet	none te trace	6 pct	none	6 pet	none
not cleaned—15 second dip in 1 g/l falty amine assiste A at 60° C—then 15 second dip in 3 g/l proprietary rinse at 70° C	10 pet	98 pet	8 pet	60 pet	trace	30 pet	noni
not cleaned—30 secend dip in 40 m1/1 of a 3.2:1 SiO <sub>2</sub> to Na <sub>2</sub> O waterglass solution + 2 g/1 K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> at 75°-89° C	none	traco	8 to 10 pct	25 pet + cloudy	nens, but disselered	5 to 10 pet + cloudy and disselered	elight to 5 pe near edges -  cloudy an eliscolare
cleaned—second dip in 1 g/l fatty amine acetate B at 70° C—then 15 second dip in 3 g/l proprietary rinse at 70° C	none to trace	80 pct	trace	trace to elight	none	none to trace	nono -  trace o cleudines
not cleaned—15 second dip in fatty amine acetate B at 70° C—then 15 second dip in 3 g/l proprietary rinse at 70° C	10 pct	95 pct	5 to 10 pct	90 pct	trace	40 pct	nen

\* expressed in pct white rust after testing

# Shock Tester Exposes Load Limits Quickly

SIMPLE principle involves unbalancing formerly balanced forces to produce controlled acceleration.

♦ HIGH-GRAVITY shock testing has never been solely limited to aircraft development laboratories. It's also been the serious and specific concern of many others in the metalworking industry, from engineer through purchasing agent to sales manager.

One may worry about product response to shock loading in use: How many gravities will it take before breaking away from the mounting bracket, for example. The purchasing agent rightly insists on arrival of parts in usable condition, regardless of tossing back and forth in transit. And the sales manager has trouble giving away a product liable to fail unpredictably, or easily damaged when shipped.

But maximum shock loads can't be developed on paper. Testing is essential. Much shock loading equipment has been cumbersome and relatively expensive because of its necessary ruggedness. Air cannons, impact hammers and drop hammers typify such equipment.

Now, it's claimed, a simply operated, compact and almost portable instrument soon to be marketed can do test work at low cost. Peak accelerations adjust readily from 10 to 500 g, says the maker, Consolidated Electrodynamics Corp., Pasadena, Calif. The equipment can provide build-up rates from zero to peak acceleration in excess of 200,000 g per second for sustained thrust conditions. All this in milliseconds from a column-like tester standing less than 4 ft high.

The tester does this by use of "overbalanced" thrust loads. Tracing this principle in oper-

ation (see accompanying illustration), high pressure in chamber A pushes against the thrust column Chamber. A pressure at this point reacts only against the area contained within the seal ring on the bottom of the piston. This high pressure just balances the lower pressure in chamber B acting against the full area atop the thrust piston.

On slightly increasing pressure in chamber A, the piston lifts a bit from its seat. Almost instantaneously, chamber B pressure expands its area of action to the full under-surface of the piston. The pressure differential snaps the piston upward at high but precisely controlled acceleration, and the test specimen with it.

#### Assures test repeatability

Simplicity of this principle in operation assures test repeatability. One reason for the tester's low-cost operation lies in its few moving parts: only the piston and a floating seal. Complex controls, rapid-acting valves and blow-out diaphragms are not used. All units have a rated operating pressure of 2000 psig and rated output thrust of 12,000 lb. At present, standard internal bore diameter is 3 in.

Each shock tester combines standard interchangeable components. These parts can assemble into a unit capable of acceleration only, or both acceleration and deceleration. The modular-type construction simplifies assembling a shock tester tailored for any specific condition of force, displacement, wave-form, velocity and specimen weight within the unit's capacity.

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#### **New Technical Literature:**

Catalogs and Bulletins

#### Descaling

Dealing with the mechanical blast descaling process, a new piece of literature covers descaling of hot rolled steel sheet and strip, slabs and billets, and plate. It also reviews conditioning of ingot molds, dressing of mill rolls, and cleaning of structurals prior to application of surface coatings. It contains almost a dozen case histories taken from mills and users' plants. Wheelabrator Corp.

For free copy circle No. 1 on postcard, p. 117

#### Steel buildings

A colorful catalog detailing a line of industrial and commercial buildings and accessories has just been published. Prominently featured in the 20-page booklet are rigid frame structures, two 50 and 60-ft bow string truss buildings and a recently developed "luxury look" metal wall. The new rigid frame buildings are available in widths of 32, 40, 50, 60, 70 and 80-ft, or multiples of those widths, in bays 20-ft long, it says. Contained in the catalog are illustrations of easily erected buildings in use as manufacturing plants, warehouses, retail operations and municipal installations. Stran-Steel Corp., a unit of National Steel Corp.

For free copy circle No. 2 on postcard, p. 117

#### Wire cloth

An answer to every conveying problem is possible. So states a chart-like piece of literature. It explains how conveyors constructed of various woven wire combinations offer many advantages. "There isn't any all-purpose woven wire conveyor belting," it readily admits. But it states that its universal weave comes "mighty close." In addition, it pictures and explains the company's weaves. Audubon Wire Cloth Corp.

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#### FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 117.

#### Vending displays

"How to Select Vending Displays That Increase Sales" is the title given to the new edition of a booklet. The 36-page book shows manufacturers how to make the most of their merchandising at the point of sale. Actual photographs show more than 20 modern corrugated displays. It also described how each attains specific objectives. Hinde & Dauch.

For free copy circle No. 4 on postcard, p. 117

#### Iso-hardness diagram

An eight-page brochure covers the development and application of the Iso-hardness diagram. Written by A. E. Gurley and C. R. Hannewald of the Chrysler Corp., it describes this as a valuable tool for analyzing steel applications because it describes all factors involved in the hardenability concept. Metal Treating Institute.

For free copy circle No. 5 on postcard, p. 117

#### Conveyor chains

Case conveyor chains designed specifically for handling cartons, cases, crates, and cans, will flex in two directions, laterally to a radius of as little as 12 inches. That's what a new company brochure says. It describes the chain as having a broad, flat carrying surface with bridged top link construction. Furnished in corrosion and abrasion-resistant metal, it will fit standard 2-inch cracks, the bulletin states. Chain Belt Co.

For free copy circle No. 6 on postcard, p. 117

#### Lift truck

With an 8000 lb capacity, a small, heavy-duty "outside-inside" truck is described in a bright 8-page booklet. Among advantages listed for the truck are: (1) long wheelbase with short overall length, (2) pneumatic tires (dual drive wheels optional), (3) low center of gravity with ample road clearance, (4) balanced weight distribution for maximum traction, (5) smooth riding, (6) easy for operator to get on and off truck, and (7) ease of operation. The Hyster Co.

For free copy circle No. 7 on postcard, p. 117

#### **Speed reduction**

An electric motor manufacturer has just published a 12 page colored brochure on the three styles of speed reduction: integral gear motors, speed reducers with separate motors, and speed reducers alone. The bulletin highlights engineering advantages in the selection of drives and contains information to be considered in the selection of speed reducers. Sterling Electric Motors. Inc.

For free copy circle No. 8 on postcard, p. 117

#### Special steels

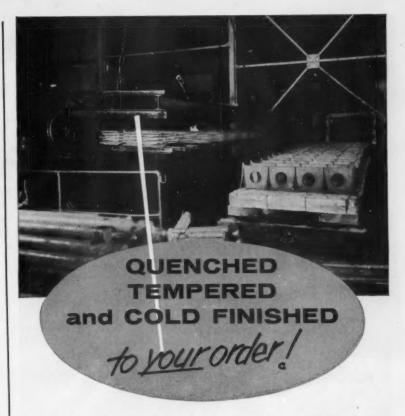
One of Europe's largest special steel mills presents the production program of its five plants in a new pamphlet. This describes the mill's program as including over 400 special steel grades and many steel products such as forged steel rolls, alloy castings, turning tools, crankshafts, etc. Covered are the firm's main plant, their forge plants, a casting division and a plant for making magnets. All are located at different cities in the Western Sector of Germany. Marathon Specialty Steels, Inc.

For free copy circle No. 9 on postcard, p. 117

#### Truck casters, wheels

Truck casters and wheels are covered in a 68-page illustrated catalog. It emphasizes how a particular line of this equipment offers efficiency, durability and economy. It lists descriptions and dimensions. Bond Foundry & Machine Co.

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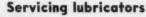


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Detailed service instructions for an automatic piston pump lubricator are offered in a service instruction sheet. The lubricator is fully automatic in operation and is preset by the manufacturer. It is comprised of a ratchet actuated by the machine on which it is mounted, reduction gears, piston pump, filter and check valves. Maintenance, operation, and starting a new machine are covered. Bijur Lubricating Corp.

For free copy circle No. 11 on postcard, p. 117

#### Preamplifiers

Vibration pickup preamplifiers and vibration pickups models are illustrated in a new folder. The preamplifier is designed as a link between the manufacturer's accelerometers models or any type of vibration pickup and one of the company's AF analyzers or amplifier models. Thus, users are provided with the absolute measurement or recording of acceleration, velocity or displacement. Brush Electronics Co.

For free copy circle No. 12 on postcard, p. 117

#### Generator sets

Its complete line of electric generator sets is outlined by a major diesel engine producer in a new brochure. It includes specifications and illustrations of over 25 radiator, and heat exchanger, cooled models ranging from 20 to 245 KW. Both 50 and 60 cycle and direct current units for emergency standby and continuous off-the-line use are represented. Features of the two-cycle engines which operate the sets and automatic starting and shut-down equipment are fully covered. Detroit Diesel Engine Div., General Motors Corp. For free copy circle No. 13 on postcard, p. 117

#### Toggle headers

Information on toggle headers appears in a new booklet. Text, photographs, reference tables and drawings are used to describe the machines used for upsetting heads on screw and rivet blanks and forming tubular rivet blanks. The Waterbury Farrel Foundry & Machine Co.

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#### FREE TECHNICAL LITERATURE

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This section starts on p. 112.

#### **Hardwood parts**

Containing information on many hardwood parts problems, a new four page folder is now available. Chapters are devoted to specifications and finishes, variety of woods, choice of finishes and type of construction. Holgate Brothers Co.

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#### Locomotive repair

"Specialized Repair Service For Diesel-Electric Locomotives" describes two specialized repair service plans offered at one firm's repair plants. These include a unit exchange plan, designed specifically to get equipment back into service. A repair and return plan assures operators that newest methods and materials are used. Westinghouse Electric Corp.

For free copy circle No. 16 on postcard

#### Control devices

Control devices are the subject of a new 12 page publication. It describes application features of control devices built to meet JIC standards and gives product data on the machine tool relay, oil-tight push button, solenoid, limit switch, magnetic starter, plugging switch, and pneumatic time-delay relay units. General Electric Co.

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#### Rotary knives

New bulletin pictures and describes various types of slitting knives. These include: solid, split and with bolted on hubs, spacers, side trimming knives, scrap chopper blades, tube mill tools, roll forming tools, and other tools designed and built specially for unusual requirements. Cowles Tool Co.

For free copy circle No. 18 on postcard

#### Air cylinders

Non-rotating air cylinders are illustrated in a 12-page book. The catalog contains engineering data on the company's line of standard air cylinders, valves and accessories. Twenty-one models of cylinders are shown in the catalog, ranging from 11/2 through 14-in. in bore sizes. Designed 100 pct to JIC standards, the cylinders have floating cushions, brass tubes to eliminate corrosion, removable bronze cartridges containing wiper and rod packing, and cold rolled steel end plates. S-P Mfg. Corp.

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#### Electrodes

Covering 44 types of electrodes, a new 28-page catalog gives applications, procedures, recommended currents, physical properties and sizes available. The electrodes include mild steel, iron powder, low hydrogen, special alloys, hardsurfacing, aluminum bronze and others. Hobart Bros.

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#### Descaling stainless

Various adaptations of the Kolene system of descaling stainless, alloys and titanium after heat treating are described in a bulletin now available. Kolene Corp.

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#### Fluid drives

Fluid drives for 1/2 to 25 hp applications are illustrated in a bulletin. It describes a company's units for industrial use in the low horsepower range. The 16-page bulletin explains the fluid drive principle and outlines the units' advantages. American Blower Corp.

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#### **Punch presses**

Punch presses with increased tonnage capacities are described in an eight-page brochure. These presses, available in 2, 5 and 8-ton models, offer greater tonnage, more improvements and proven performance, it says. It lists 18 advantages, gives a page of specification data, explains how to lick big press jobs with low-cost equipment, and offers various product in formation. Benchmaster.

For free copy circle No. 23 on postcard

#### Solid film lubricants

Lubrication problems can be solved with solid film lubricants, says a dozen-page pamphlet. It describes the lubricant as a clean, dry, bonded to the surface material. Longer wear life, it says, results, along with lower co-efficient of friction and trouble-free lubrication of moving parts. What the material does, its description and technical data is included. Electrofilm, Inc.

For free copy circle No. 24 on postcard

#### Torque wrench

Designed and engineered specifically for production line and construction use, a new torque wrench is described in a data sheet. The torque-limiting wrench combines: speed, precision, durability and low cost, it states. Specifications and text describe it and give its advantages. Jo-Line Tools, Inc.

For free copy circle No. 25 on postcard

#### **Gravity conveyors**

Wheel and roller type gravity conveyors are easier and faster, according to a brochure now available. It includes basic information concerning the conveyors and offers construction facts, specifications, accessories provided and installation instructions. A. B. Farquhar Div., The Oliver Corp.

For free copy circle No. 26 on postcard

#### Overhead conveyor

A quality, low cost overhead conveyor is described in a four-page bulletin. It lists features of the lightweight and flexible conveyor, and also illustrates its uses. Chainveyor Corp.

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#### Mechanical comparator

Economical quality control for profitable production can be achieved with a mechanical comparator described in a new booklet. The instrument is described as: easy to read, readily portable, accurate, dependable, versatile, adaptable, and offers magnetic damping and uniform gage pressure. Pratt & Whitney Co., Inc.

For free copy circle No. 28 on postcard

#### Magnet scrap grabber

Combining a grapple-type handler and a magnetic-type one, a new scrap transporter is described as offering many advantages of both in a new folder. It can be used with or without the magnet. A four-tong design allows it to close on scrap, steel turnings, etc. M. P. McCaffrey, Inc.

For free copy circle No. 29 on postcard

#### Welders

Single knob control for spot and projection welders is the subject-matter of a brochure. It illustrates and explains the welders and lists key features. Among these are: (1) one knob setting for air operated spot or projection welders, (2) calibrated and preset for pressure, weld time, heat control and hold time, and (3) over 100 combinations of materials and thicknesses. Thomson Electric Welder Co.

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#### **Pushbutton** switch

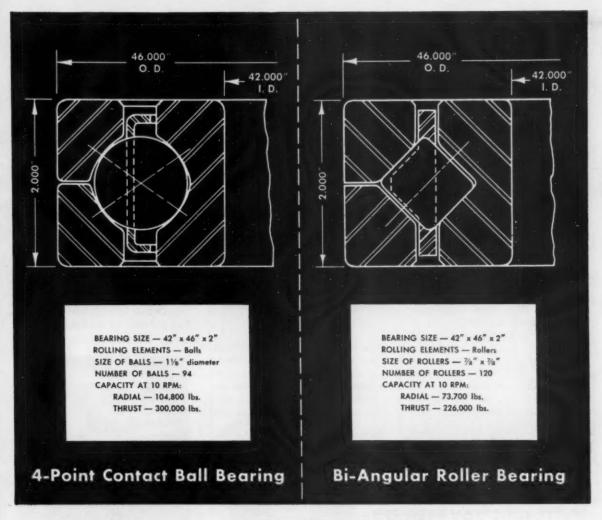
A three light pushbutton switch for use in complex console panels is described in a new data sheet. Although very compact, this assembly will light in three different colors and provide a double-throw, double-pole switching function, the literature states. Micro-Switch Div., Minneapolis-Honeywell Regulator Co.

For free copy circle No. 31 on postcard

#### Milling machine

Literature now available introduces a small, compact transfer machine to double-end mill and center drill, employing the in-line transfer princple. Motch & Merryweather Machinery Co.

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## SURE we make both, but we recommend only one

Yes, Kaydon manufactures both — 4-point contact ball and bi-angular roller bearings in the same diameters and widths. BUT—we would in almost every instance recommend the former. Why? Because our field application reports consistently prove that the 4-point contact ball bearings are better for most applications than the lower capacity bi-angulars (See capacity figures in drawings above.)

Another important difference between the two

bearings is that the 4-point contact ball bearing is not limited to low speeds, whereas the bi-angular normally should not be used above 10 rpm and usually is suitable only for oscillation. Then, too, the torque in the 4-point contact ball bearings is generally much lower.

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#### **HANDLING: Steel Mill Work Roll Tongs**

Work rolls carried from heat treating to stress relieving operations throw off pieces of metal en route... This creates a safety hazard... Special tongs prevent this threat to personnel at one steel mill.

When steel mill work rolls, during their manufacture, are carried from the heat treating to the stress relieving operations, the change in temperature creates a safety hazard as pieces of metal sometimes fly off the roll in transit.

To safeguard personnel in such an eventuality, the Homestead Works of U. S. Steel Corp. uses specially-designed tongs. These carry the work rolls safely and quickly.

#### Automatic Locking, Unlocking

The tongs, manufactured by Heppenstall Co., New Brighton, Pa., consists of four scissors-type

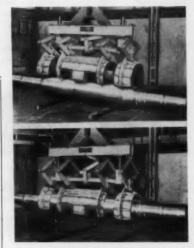
#### WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 117. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

jaws, suspended from a steel beam. They have an automatic locking and unlocking device. The jaws are designed so that they enclose most of the body of a work roll, both in the center and at each end.

The automatic operation of the tongs creates an additional safety feature. All operations can be controlled by the craneman, with no necessity for personnel to fasten chains or rigging.

The tongs are lowered over a work roll with their jaws locked open. However, when the craneman begins the lift, the lifting action unlocks the mechanism so that



Jaws enclose most of the work roll's body, eliminating hazards.

the jaws close around the roll and hold it firmly. When the roll is safely delivered at its destination and again rests on a firm surface, lowering the tongs a few extra inches causes their jaws to lock open again, releasing the load.

#### Weighs 5200-lb Overall

Manufactured for rolling mill use, each work roll consists of a body 84-in. long and 19½ to 29½ in. in diameter, and a journal at each end, with a total weight of about 5200-lb.

#### Creative engineering ability

... is a part of every WSM transaction—particularly when there's a stamping problem of unusual design, the working of a new material or the challenge of a unique fabricating procedure. Instead of wasting time . . . let WSM engineers quickly help you get low-cost, fast and accurate stampings.



Here, you'll find complete equipment, ready to produce light, medium, heavy and deep drawn stampings in all shapes and sizes . . . with deliveries to meet your requirements.



#### Methods:

Low temperature pickling reduces acid waste.

Pickling at low temperatures allows acid savings, reduces waste disposal costs, and results in better pickling. This is the conclusion of galvanizers who have conducted low temperature pickling tests.

Acid consumption in the pickling of continuous welded pipe was reduced to 13.9-lb of 66° Be sulphuric acid per ton in tests carried out at National Supply Co., Etna, Pa. It was concluded that the investment in extra tanks to permit longer pickling would be more than justified by the cost cuts.

#### No Radical Practice Changes

No changes have been made in the inhibitors or acids and no radical change in practice is reported. However, a company spokesman says considerable improvements have resulted from the training of picklers and elimination of their wasteful habits.

Slow pickling at low temperatures prevents excessive solution of iron and slows reduction of acid concentration. It may require more pickling tanks to meet requirements of the galvanizing kettle, however. Use of rocker-type tanks in which pipe is constantly moved in and out of the acid can reduce the number of tanks. Pickling tanks of this type are replacing the remaining still tanks at National Supply Co. Thus, they will reduce the total number of tanks from five to four when present plans are consummated.

#### Pickled 228.3 Ton of Pipe

The test was kept under close control starting with a new solution of 2824-gal of acid in one tank from the rocker type pickler. Concentration was 7.58 pct by volume of 66° Be sulphuric acid. Three quarts of a popular brand of inhibitor were used to retard the solution of the steel in the acid. Solution temperature was 75°F at the start of pickling. Total time in use for pickling was

## torture



### Up to 30 tons' tension... to test conveyor belt life

In the Electro-Alloys physical laboratory, a Thermalloy conveyor belt is being set up for testing in a hot, tensile test furnace to determine load limits. Tension up to 30 tons can be applied here. This laboratory also carries on Brinell testing, tensile tests as cast, after-aging and stress rupture tests.

Testing of this type in our physical laboratory is just one phase of research and quality control at Electro-Alloys. Our Elyria plant has a completely equipped metallurgical laboratory for study of heat and abrasion problems encountered by our field sales engineers.

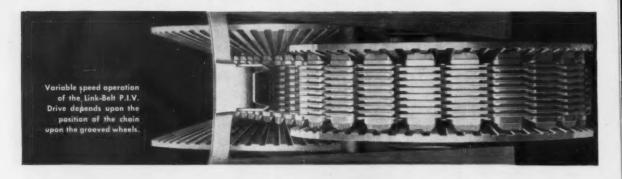
Let us put our facilities to work to solve your heat-treat problems—call your local Electro-Alloys representative or write for a copy of booklet T-225. Electro-Alloys Division, 70111 Taylor Street, Elyria, Ohio.

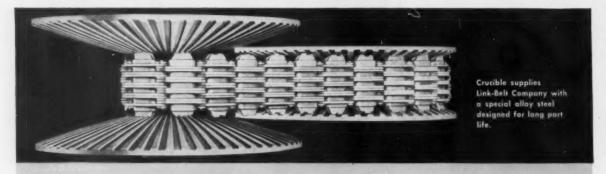
\*Reg. U. S. Pat. Off.—designating not just one but a group of alloys—each developed to meet specific heat and abrasion problems.

HEAT-RESISTANT CASTINGS • TRAYS • MUFFLES
RETORTS • CONVEYOR BELTS • RADIANT TUBES



ELECTRO-ALLOYS DIVISION Elyria, Ohio





these

#### SPECIAL ALLOY STEEL PARTS

keep Link-Belt's P.I.V. Drive on the job



Keeping production operations going at the right speed is the job of this variable speed drive unit produced by Link-Belt Company. Its operation is based on an exclusive drive chain with self-forming metal teeth, which engage with radial grooves in two pairs of cone-shaped wheels

To make these precision wheels requires a steel that can be readily machined, will not distort, and which has high-strength. That's why Crucible furnishes Link-Belt with a special Nitriding BM alloy steel designed for this application. After machining the wheels are Nitrided to obtain a minimum surface hardness of 1000 Vickers Diamond Brinnel — about the hardest surface that can be obtained commercially.

When your application requires a tough, machinable, nondeforming alloy steel — call Crucible. One of our many special alloy grades may be the right one for you — or we can develop one to meet your most exacting demands. Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

100 hours and 24 minutes. Total quantity of acid used was 3190-lb. Total tonnage of pipe pickled in the test was 228.3 tons.

Some lifts required longer pickling than others because of stubborn layers of scale inside a few lengths of pipe. Solution temperature was raised to 122°F and the number of pickling tanks was increased in order to maintain flow to the galvanizing kettle without wasting acid.

#### Former Practice Wasteful

Former practice called for giving the tank another charge of acid as well as an increase in temperature. As a result, iron concentration would gradually build up to 6 or 7 pct. Pickling would then become difficult and the tank would have to be discharged, thus wasting 500 to 600 lb of 66° Be sulphuric acid.

Another waste of acid resulted from storing pickled pipe under water in rinse tanks. Some waters, especially raw water which has a high oxygen content, cause formation of a layer of iron oxide which is difficult to remove. This is especially troublesome and wasteful of acid with small sizes of pipe because of reduced acid circulation. Dry storage of pickled pipe while waiting to be galvanized was decided on for this reason.

#### Research:

#### Scientists observe imperfections in crystalline materials.

Metals many times stronger than the best commercially available today have been brought a step closer with a new technique for observing the motion of tiny imperfections in crystalline materials.

#### **Uses Etching Solution**

The new research technique, described by Dr. John J. Gilman and Dr. William G. Johnston, of the General Electric Research Laboratory, Schenectady, N. Y., involves the use of an etching solution and crystals of lithium fluoride. When the crystals are etched with a special acid solu-

tion, atomic imperfections in the crystals are revealed and can easily be photographed. The imperfections are believed to hold the key to the strength of such crystalline materials as metals and ceramics.

#### Real Crystals Weaker

Real crystals are much weaker than the pure, nearly perfect crystals which the physicists and metallurgists work with in the laboratory, says Professor Robert L. Sproull of Cornell University. Engineering materials, such as structural steel, must necessarily be made with the common, or garden, variety of crystals. The defect in these crystals which is responsible for their weakness is called a "dislocation." When a piece of steel stretches or fails in service, dislocations are thought to be moving inside the individual crystals of the metal.

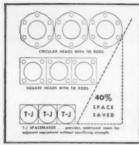


### STRONGER, TOO



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- NEW exclusive Ingenious Cushion Designs . . . Super Cushion Flexible Seals for Air . . . New Self-Aligning Master Oil Cushion
- Compact design eliminates tie rods, saves up to 40% space
- Preven Performance . . . with Extra High Safety Factor
- Hard Chrome Plated Bodies and Piston Rods (Standard, at no extra cost)
- OIL pressure up to 750-AIR to 200 P.S.I.



NEW LITERATURE . . . send today for new Bulletin with complete details of Spacemaker line. You'll find many answers to automation in your plant with T-J Spacemaker Cylinders! Designed with years-ahead features for top performance and dependability. Wide range of styles, capacities . . . for all kinds of push-pull-lift operations . . . reduces man-hours and costs! Write The Tomkins-Johnson Co., Jackson, Michigan.

MEMBER OF THE NATIONAL FLUID POWER ASSOCIATION

TOMKINS-JOHNSON

#### Machining:

Automation benefits obtained with rotary indexing unit.

Essential benefits of automation can sometimes be obtained with rotary indexing machines, as well as with transfer-type in-line units. This is the conclusion of a large electrical manufacturer.

An eight-station rotary indexing model performs more than twenty operations on air conditioner compressor crankcases for the firm. Operations include rough boring, counterboring, facing, spot facing, drilling, chamfering, back-chamfering and tapping. The machining cycle is entirely automatic, including clamping and unclamping.

#### Made of Die-cast Aluminum

Made of die-cast aluminum with cast-iron cylinder liners, the crankcases are of three different kinds; of one, two and three cylinders respectively. While periodic output for each kind is high, change-overs from one kind to another must frequently be made according to market demand. An average net production rate of 87 pieces per hour is normally maintained.

In addition to its facility for quick job change-overs with relatively static tooling, the machine has provided other benefits, according to this manufacturer. Cited among the latter is the minimum floor space that it occupies, and its operational independence from other machines, floor location considered. The machine was supplied by Ex-Cell-O Corp., Detroit.

#### Controls:

Tractor has no operator, no guidewire either.

Electronic industrial tractors made news when human operators were replaced with guide wires embedded in the floor or anchored to the floor with a tape. Now, they can operate without the guidewires. In fact, they can now operate with-

out guide wires and without human operators.

#### Optical Guidance System

The latest materials handlers make use of an optical guidance system. In place of the taped down or buried wire, they now require only a painted line or a white tape on the floor. Moreover, special paint is not needed. Any good grade of white paint may be used.



Tractor follows the white line painted on the floor.

Light emanating from a small, low-powered bulb in the "sniffer box" reflects from the white tape or paint on the floor and actuates photo-electric cells. The tractor thus steers accurately in the direction of the line at all times.

#### Compatible With Wire-Type

One of the unique features of the new system, as described by Barrett Electronics Corp., Northbrook, Ill., is that it is compatible with the present Guide-O-Matic tractors. The equipment used throughout is exactly the same, except for the sniffer box. The optical-type can be converted to the wire-type at any time, should the need arise.

#### Power:

Gas turbine units exceed expectations.

A rugged endurance test of 500 hp gas turbine engines has just been completed. The turbines were used to drive shipboard gen-

## HAVE YOU HEARD ABOUT THIS EXTRAORDINARY CLEANER?

#### It saves money in paint shops!

Oakite Rustripper is an alkaline material that strips paint, pigment residues and phosphate coatings from steel at the same time that it removes rust and oil.

#### It saves money in plating shops!

Oakite Rustripper removes rust or heat scale from steel at the same time that it removes oil and other soils. It avoids hydrogen embrittlement, damage to machined surfaces and other disadvantages of acid pickling.

#### FREE

For more information about how Oakite Rustripper eliminates operations in paint shops and plating shops, send for one or both of the illustrated booklets listed in the



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Send me free booklet checked below:

- "Here's the best shortcut in the field of organic finishing"
- "Here's the best shortcut in the field of electroplating"

Name

Company

Address

INCREASE
GEAR SHAVING
OUTPUT
with
VERSATILE
SEMIAUTOMATIC
LOADING



The operator handling a conventional rotary gear shaving machine is required to make 7 separate motions for each work part shaved."

With semi-automatic loading this is reduced to just 3 operations.

- Place work gear on the pre-locator.
- 2 Press the start button.
- Remove the shaved gear.

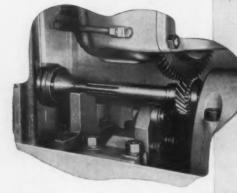
The rest of the cycle is automatic.

#### Results are:

- Higher production
- Lower machining costs
- Less operator fatigue
- All the versatility of conventional shaving
- Greater safety
- Operator has ample time to serve 2 or more machines

The approximate work locater and head and tallstock centers or plugs are the only work part changes that are additional to a conventional gear shaver.

Red Ring Shaving Machines, Models GCU and GCI may be equipped with this equipment.



Write for Estimated Savings on Your Particular Operation.

Plastic Splash-Guard Used for Demonstration Only. ORIGINATORS OF ROTARY SHAVING

NATIONAL BROACH & MACHINE CO.

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7388

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

erators. Installed with the expectation that the gas turbines would operate 500 hours each before overhaul would be necessary, they actually operated 1500 hours each, and were still in excellent condition.

#### **Equal to Other Engines**

Although gas turbines are a relatively new development, these tests and others indicate that these power plants offer operating life and reliability equal or superior to other types of engines. "Actually, 1500 hours of operation is equivalent to an automobile running 75,000 miles at 50 miles an hour before overhaul," say the engine's makers, Solar Aircraft Co., San Diego, Calif.

The engines are single shaft gas turbines with 10 stage axial flow compressors and three stage axial flow turbines. They operate at a speed exceeding 20,000 rpm. Each gas turbine drives two generators providing a total of 210 kw of direct current.

The units weigh only 790 lb, compared with 5000 to 7000 pounds for reciprocating engines of a similar rating.

Another major advantage of the turbines is their lack of vibration and their low-frequency noise.

#### Materials:

#### Electrical contacts withstand high currents, won't weld.

New electrical contacts able to withstand larger currents than do silver or its alloys without welding or sticking have been introduced.

#### Contains Silver, Cadmium Oxide

Containing silver and cadmium oxide the contacts cause significant improvement in life and performance of many electrical products when substituted for silver or silver alloys. So reports their developer, Gibson Electric Co., Pittsburgh. In others, they provied greater current-carrying capacities and increased electrical ratings. They have excellent arcquenching traits, low contact re-

sistance, high conductivity and low material loss.

#### Cost Compares With Silver

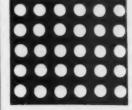
Typical successful applications for the new silver and cadmium oxide contacts already include motor-starting and limit switches, light and medium-duty contactors, light and medium-duty relays, aircraft relays and industrial controls. They are comparable to fine silver contacts in cost.

The contacts include silver and cadmium oxide materials of sintered powdered-metal mixtures, and materials fabricated from wrought alloy compositions. According to Gibson tests, the latter tend to have more resistance to electrical and mechanical wear.

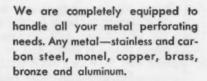
Silver and cadmium contacts are supplied in the form of discs, rectangles, irregular shapes in sizes up to 1-in. thick x 8-in. sq maximum.



## metal perforating? let WISSCO do it



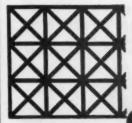
promptly...efficiently ...economically



Our facilities include extensive stock of standard and special dies. Special die-making, rolling, forming, shearing, welding and assembling equipment is available.

We can furnish stock to be perforated or it may be supplied by you.

WICKWIRE SPENCER STEEL DIVISION OF CF&I— Atlanta · Boston · Buffalo · Chicego · Betroit New Orleans · New York · Philadelphia CF&I Offices in Caneda—Montreal · Torento



2489

## PERFORATED METALS PRODUCT OF WICKWIRE SPENCER STEEL DIVISION THE COLORADO FUEL AND IRON CORPORATION



#### ... to test performance, speed reordering

valuable wire rope facts

For efficient wire rope operation you must have wire rope facts—brief, handy, accurate facts. You need them for safety (when did that line go on?). You need them for reordering (what size is the hoist line?). And you need them most of all for figuring cost (how long did it last?).

But gathering wire rope facts can be time-consuming—unless you have an easy, simple system.

Leschen's Service-Score Stickers provide such a system. The facts are always at hand—on the machine while the wire rope is working, and in the record book from then on.

Service-Score Stickers make it easy to compare the service you get from various rope constructions, types, and brands, so you *know which one is best* for you.

With the Service-Score System you prove to yourself that Red-Strand wire rope consistently exceeds industry standards for strength and safety.

Write for your starting supply of Service-Score Stickers now —or see your Leschen distributor.



Keep the score and you'll use it more Red-Strand Wire Rope

LESCHEN WIRE ROPE DIVISION H. K. PORTER COMPANY, INC.

St. Louis 12, Missouri

#### Coating:

Forged rings improve glass coating of steel.

The combination of different types of steels (steel plate, forged steel rings, and weld metal) in the fabrication of glass-lined vessels creates problems in producing a uniformly tight bonded glass coating on the inside walls.

#### Glass Coat Won't Crack

Solution of the problem of maximum durability of these vessels depends on special analyses and methods of production of the materials and fabrication technique. Glass coatings are bonded tight



Application of glass is by liquid spray, followed by dusting.

enough on the metal surfaces to hold the glass under compressive stress. Thus they are safe-guarded against cracking and chipping under severe conditions of stress and temperature.

The problem has been most critical in the large flanged openings in these vessels and in the welds. Forged rings are used for these flanges for several reasons. They provide greater thickness of metal at the bend and ample material for forming a bead for retention of clamps that hold covers tightly on the gasketed flanges. Forged rings also minimize warping and give a large area of flat surface for gaskets.

Machining Time Held Down

Standard Steel Works Div. of Baldwin-Lima-Hamilton Corp.

makes finished rings for Glascote Products, Inc., Cleveland, by a forge rolling process. This shapes them so that the amount of metal to be removed by machining is minimized. These forged rings for glass-lined vessels range in size from 15-in. ID to 84-in. in diameter.

Principal advantage of forged ring flanges, aside from the added strength that they make possible, is the tight bond that is produced when glass coatings are fused to this steel.

#### Fasteners:

Silicon bronze screws resist sub-zero weather.

Radar installations under construction at the rim of the Arctic Circle utilize silicon bronze fasteners to hold them together.

The installations, consisting of a series of plastic-domed buildings, are part of the Distant Early Warning spotting system. The domes come in kit form, each kit containing every tool, part and fitting required for fast erection. Their construction is under the supervision of Western Electric Co.

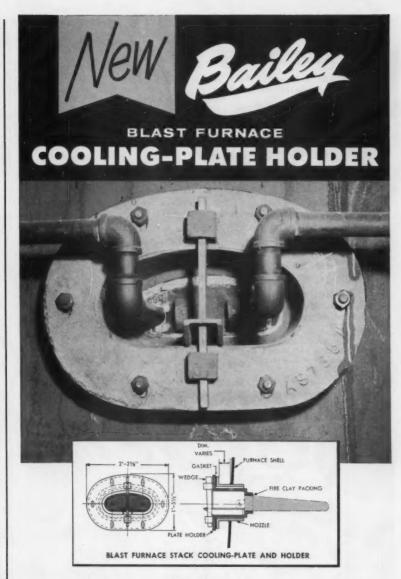


Silicon bronze fasteners like this resist cold, have long life.

Kits also include silicon bronze, hex-head screws, nuts and washers. Each dome has 4500 screws when completed.

#### Easily Assembled In Bad Weather

These silicon bronze fasteners measure ½-in. in diam by 1½-in.



- · Easy Removal
- Gas-Tight Seal
- For New and Relined Furnaces

The unit is adjustable for maximum contact between brick and plates, and one size of holder can be used on all furnaces.



# Handle your loads on sturdy legs

Conditions sometimes make it desirable to handle loads with a

EUCLID FULL GANTRY CRANE



such as this one rather than to build an expensive runway; or on a half gantry crane with one end of the bridge traveling on a runway attached to the building.

As a result of Euclid's long service to industry many manufacturers have formed the habit of coming to this company for advice as to the size and type of crane or hoist best adapted to their requirements.

The Euclid line is extensive — including units for practically all conventional needs. Euclid experience has also covered the developing of equipment for various unusual needs.

Write for Euclid crane and hoist literature and contact us if we can be of service in any way.



THE EUCLID CRANE & HOIST CO.

1361 CHARDON ROAD CLEVELAND 17, OHIO



#### TECHNICAL BRIEFS

in length. Manufactured by the Cleveland Cap Screw Co., Cleveland, Ohio, they were selected primarily because of their resistance to sub-zero temperatures. They are easily assembled under unfavorable weather conditions, are non-corrosive and have long life. The fasteners are cold-headed for extra strength.

#### Welding:

Stud welding saves a clean 60 pct.

Cost of securing cover plates on commercial dry cleaning machinery has been cut 60 pct through use of stud welding, reports a user.

Before standard threaded studs were adopted, the Vic Cleaning Machine Co., Minneapolis, fas-



Operator welds studs on a tube for a washer-extractor unit.

tened cover plates to the welded assemblies with bolts inserted in drill holes to obtain the required accuracy. The bolt heads were hand welded on reverse sides of the holes.

#### Faster, Easier, Accurate

Besides being inherently much faster, easier, and just as accurate as the former fastening method, the user also reports flexibility and freedom of design. Studs are end welded from only one side of the base plates. They may be



Sheet

Your particular requirements for uniformity in workability, formability and drawing properties guide every step in the production of J&L Sheet Steel.

Depend on J&L Sheet Steel to help you get the best out of your production equipment and add to the value of your finished product.

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Jones & Laughlin



Photo courtesy of Caterpillar Tractor Co., Peoria, III.

it's only part of the HTM\* story...

#### STRENGTH

High ultimate strength of HTM castings helps the famous Cat D7 Tractor do the tough jobs day-in and day-out. Vital parts, such as the front idler adjusting nut shown, are made from HTM metal . . . the metal with the high ultimate strength that resists wear and fatigue under heavy loads.

And there are lots of other "plus" advantages in HTM castings. For example, they possess excellent non-seizing properties . . . can be either liquid or airquenched . . . can be given a smooth finish. Perhaps most important of all, HTM machinability index ranges from 80 to 90 (B1112 steel = 100).

HTM castings can often reduce manufacturing costs, weight and assembly time . . . can increase quality and sales potential of your product. AA-STIM-A

\*HTM-High Tensile (Heat-Treated) Malleable

#### NATIONAL MALLEABLE CASTINGS COMPANY

Established 1868 - Cleveland 6, Ohio

the nation's largest independent producer of malleable and pearlitic malleable

placed in locations where hand welding on the backsides would be difficult, if not impossible. Studs are \%-in. in diameter and either 1 or 2-in. long.

#### Appearance, Maintenance Factors

Vic Cleaning also reports improved appearance and easier maintenance is realized by using stud welding.

Sheet metal templates are used to located studs accurately at most points. On some applications, however, the actual cover plates have been used to locate center punch marks. The welding generator is centrally located in the shop so that all machinery being assembled may be reached with one stud welding gun.

#### Alloys:

Inconel 0.002-in. diam rod has unmarred surface.

Inconel rod that maintains a 0.0002-in. diam is being produced in quantity for use in anti-aircraft guided missiles. Specifications call for a rod with a surface absolutely free from scratches, pits or blemishes.



Micrometer measures a perfect 0.002-in. diam Inconel rod.

Produced by a secret process in the Straightening & Cutting Dept. of Techalloy Co., Inc., Rahns, Pa., the rod is finer than a human hair.

#### Smallest Rod Was 0.031-in.

Prior to now the smallest rod thought commercially practical by the producer was 0.031-in. in diameter with a cross section measuring 0.00075-in. The new Inconel rod has a 0.002-in. diam with a cross-sectional area of only 0.000031-in. Thus, it is 200 times smaller than the next larger rod.

#### Materials:

Special hose assembly solves dehydration problem.

When copper tubing used to dehydrate heat exchanger coils failed under constant use, a large air conditioning equipment manufacturer solved the problem by installing a specially-engineered flexible hose assembly. This consists of a fluorocarbon resin tube jacketed in stainless steel wire braid.

The company, Kennard Corp. of St. Louis, dehydrates all volatile refrigerant-carrying coils after fabrication and before shipment to customers. This dehydration process is used on all direct expansion coils, liquid chillers, and evaporate condensers. It includes placing the coils in an oven, 20 x 6 x 8-ft, and baking for six hours under vacuum. Oven temperature is 280°F; vacuum is 700 microns absolute pressure.

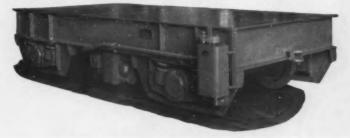
#### Copper Tube Used Previously

Previously, copper tubing was used to connect the coils to a manifold, which in turn was connected to a vacuum pump. However, under constant use the tubing, bent to fit between the coils into the manifold, work-hardened to the point where it soon fractured and became useless. In addition, slight fractures which went unnoticed often necessitated running an entire batch of coils through the process a second time.

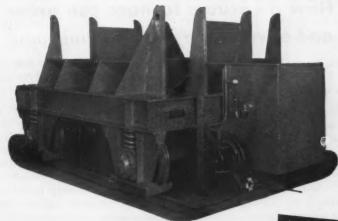
In an effort to find a flexible connection that would withstand rigorous operating conditions, Kennard engineers decided to install the special hose assembly. Approximately 20 assemblies, 8-ft long and 5/16-in. ID, were installed as vacuum lines between the manifold and units to be dehydrated. Brass couplings were

# TRANSFER IT SAFELY at Less Cost with ATLAS

Atlas Safety-Type Transfer Cars are outstanding for moving heavy materials over short distances. Designed for storage battery, diesel or gas-electric, or cable reel service. Only one simplified control lever for safety. The car moves only when the operator holds the lever.



**50-TON STORAGE BATTERY FLAT CAR** 



64-TON ELECTRIC FLAT CAR

Request "Walk-Along" Bulletin 1283

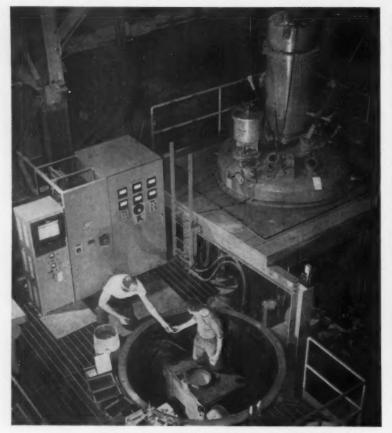




THE ATLAS CAR & MFG. CO.

ENGINEERS

MANUFACTURERS CLEVELAND 10, OHIO, U. S. A.



CVC vacuum furnace at Blairsville, Pa. plant of Westinghouse Electric Corp.

## How a vacuum furnace can grow and save money for Westinghouse

When Westinghouse wanted a flexible, high-vacuum furnace, they came to us with two special requests:

- 1. They wanted a furnace with 350 pounds capacity for development work,
- 2. They wanted to expand this furnace's capacity quickly and economically should the need arise.

Our engineers designed the furnace around a group of modules or "building blocks" to meet these requests.

Westinghouse will up the capacity to 1000 pounds simply by substituting larger crucibles for the 350-pound size now in the furnace. Basically, the rest of the furnace stays the same.

Westinghouse can make the furnace semi-continuous and increase production to 60 tons or more a month of ultra high-purity vacuum metals simply by adding two valved interlocks—one for charging, one for mold removal.

Switching from single to multiple or centrifugal molds requires only a change in the furnace bottom.

In all cases, a minimum number of parts need be purchased.

Three CVC information memos outlining the furnace's design and operation in detail are available on request.



#### Consolidated Electrodynamics Rochester Division, Rochester 3, N. Y.

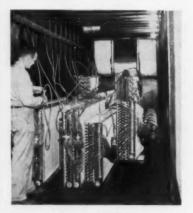
formerly Consolidated Vacuum

NATIONWIDE COMPANY-OWNED SALES AND SERVICE OFFICES

used to make connections between the coils and manifold.

#### No Hose Failures

The new arrangement is reported to be "eminently satisfactory." In addition to flexibility, the assemblies have provided high resistance to temperature and pressure. No hoses have failed in the two years since installation.



Operator connects hose used as flexible connection.

The hose assembly, manufactured by Resistoflex Corp., Roseland, N. J., consists of a specially compounded and extruded Teflon resin tube, designed to withstand temperatures of 450 to 500°F and pressures to 1000 psi. The tube is jacketed in stainless steel wire braid for high tensile strength and fatigue resistance and fitted with blow-off-proof steel couplings, swaged directly onto the steel sheath.

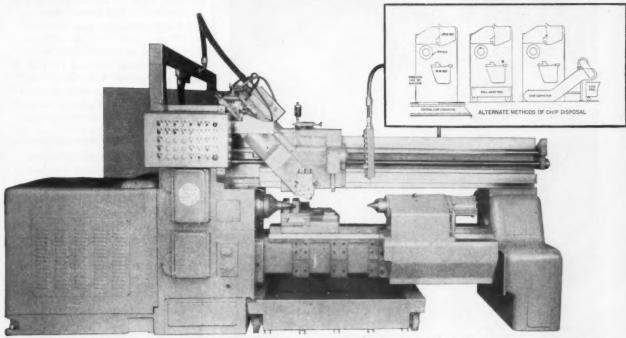
#### Testing:

Wind tunnel air control valve weighs 34 tons.

Having a total weight of 34 tons, a huge air flow control valve has been delivered to North American Aviation's Los Angeles plant. Destined for use in high-speed blowdown-type wind tunnel, the giant valve is 13-ft outside diameter by 15-ft overall length.

Designed and constructed by Pittsburgh-Des Moines Steel Co., Pittsburgh, the unit has an air

### A BETTER METHOD OF MACHINING REAR AXLE, AND OTHER SHAFTS



● The new Models LQ and AQ Seneca Falls Automatic Lathes are designed to combine the best and fastest methods of rough and finish turning shafts on a single machine without removing the work and without attention on the operator's part.

The line drawing shows a machining operation on the stem end of a rear axle shaft which is rough turned with multiple tools on a rear carriage while finish turning is done with single, tracer-controlled tools on each of the two overarm carriages. Thus the advantages of multiple tooling for stock removal and single tool tracer turning for accurate finish operations are combined. By this method extremely close tolerances are maintained since the pressure of the single tool is constant over the entire length of the work piece, and full advantage can be taken of the higher cutting speeds now possible with the newer carbide and oxide tool materials.

The machining operation is completely automatic... the operator loads shafts between centers and pushes the starting button; multiple tools rough turn; tracer tools then finish turn; and finally the machine stops with all tools returned to starting position.

A similar type lathe is used for the flange turning operation. Varying application of multiple tooling or single tracers to either rear or overarm carriages is possible on these lathes and complete "in line" automation can be engineered to specific production requirements,

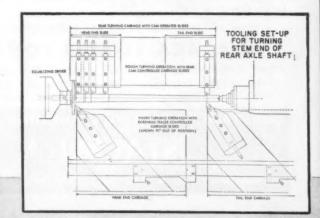
SENECA FALLS MACHINE CO., SENECA FALLS, N.Y.

Write for Bulletin Q-56-F

Seneca Falls Model AQ Automatic Lathe Equipped for Flange Turning Operation on Rear Axle Shaft. 60 H. P., Net Wt. 25,000 Lbs. Also Model LQ, 30 H. P., Net Wt. 20,000 Lbs.

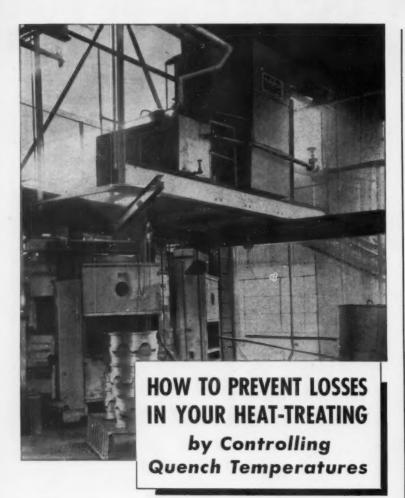
#### **DESIGN FEATURES**

- Simplified changeover features for reduced set-up time.
- Feed rate may be automatically changed during cutting cycle.
- ▶ Streamline design for efficient chip guarding.
- Screw feed to all carriages.
- Four speed head with automatic change-over.
- Large chip flow area.
- ► All templates clear of chip area.
- All ways hardened, ground and replaceable.
- Den front design facilitates loading and unloading.
- Straight line diameter adjustment for tracer tools . . . no shoulder length change to correct.



NEW SENECA FALLS

MODEL LQ AND AQ AUTOMATIC LATHES



 Using Niagara's AERO HEAT EXCHANGER to cool your quench bath never fails to give you real control of the temperatures at which

you wish to quench.

Your experience will be the same as others who have installed this method. You'll get better physicals; save losses and rejections; increase heat-treating capacity and production with lower costs. You can put back heat into the quench bath to prevent the losses of a "warm-up" period. You remove heat at the rate of input and prevent flash fires in oil quench baths.

You'll save space in your heat treating department and get a more productive arrangement because less room is needed for coolers and tanks. You'll find savings in piping, pumping and in the amounts of oil you will have to buy. And the saving in the cost of cooling water alone is enough to repay the cost of the Niagara Aero Heat Exchanger, usually in less than two years.

Write for Bulletin 120 and further information

#### NIAGARA BLOWER COMPANY

Dept. IA, 405 Lexington Ave.

New York 17, N.Y.

Niagara District Engineers in Principal Cities of U. S. and Canada



passageway 96-in. in diameter and operates at a maximum upstream pressure of 132-gage, regulating the downstream to from 5-psi to 100 psi. The valve is designed for a maximum flow of 40,000 cu ft of air per second, or about 11/2 tons of air per second. When operating at full capacity the valve modulates an airstream having a total energy of about 11/2-million hp.

#### Hydraulic Plug Operates Cylinder

The valve is practically tightclosing on stainless steel metal-tometal seats. The plug used to effect the seal and to modulate the flow is a hollow cylindrical section which is moved longitudinally in a closed cylinder so that the projecting end contacts a seal in the valve body. The plug is operated



This 96-in. valve offers 132 lb per sq in. pressure.

by a hydraulic cylinder but the valve is so perfectly balanced that very little force is required for its operation.

Areas of the plug are chosen so that unless the valve is held open it will go shut against the full upstream pressure of 132 psi

The entire valve is installed by welding into the upstream end of the settling chamber of the large blowdown wind tunnel. It is controlled by electronic equipment so that flow at the desired regulated pressure can be established within only a few seconds after the operation is started. Controls are so sensitive that the pressure in the settling chamber may be maintained to within less than one pct of the set pressure.

#### Coatina:

Rubber blanket outlives rubber-faced rollers.

A rubber blanket for coating metal sheets has approximately twice the life of conventional rubber-faced rollers. It also permits substantial savings in roller inventory, storage space, freight charges, re-facing costs, and down time for roller change. So reports its maker, Jomac, Inc., Phila.

#### **Rubber Is Bonded To Canvas**

It is made by bonding a thick layer of rubber to a canvas blanket and grinding to a smooth surface. It may be used either for spot coating (by cutting out non-coating surfaces), or for solid coating.

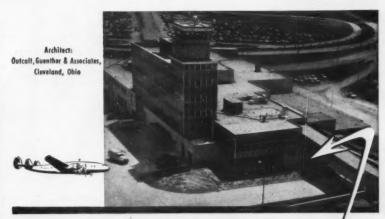
The rubber blanket is installed on a special core, which has a gap running the length of the core. Blankets' ends are held securely by a locking device inside the gap. The blanket-covered core is op-



Blanket is installed on a special core and locked tight.

erated in exactly the same way as the conventional rubber-faced core.

The core can accommodate blankets of its own width or shorter. When a run is completed with one blanket, another blanket can be quickly installed for the next run. By using one core per coating machine, core inventory is drastically reduced. Since blankets can be hung vertically, storage space requirements are practically eliminated.



**New \$5 Million Cleveland Air Terminal Features Kinnear Rolling Doors** 



level of efficiency, the baggage room is equipped with Kinnear Steel Rolling Doors.

The space-saving coiling upward action of Kinnear Doors has made them top choice through more than a half century of progress in building design, such as this new terminal represents.

Every foot of floor and wall space surrounding Kinnear Rolling Doors - within an inch or two of the door curtain, either inside or outside the building - is fully usable at all times.

When closed, the rugged curtain of interlocking steel slats (originated by Kinnear) provides extra protection against theft, intrusion, vandalism, storm, accidental damage, and fire. When raised, it clears the entire opening and stays out of reach of damage by wind or vehicles.

Highest resistance to rust and corrosion is assured by Kinnear's heavy-duty hot-process galvanizing, which applies a full 1.25 ounces of pure zinc per square foot of metal, by ASTM standards.

Kinnear Rolling Doors are built any size. Motor operation with push-button control also available. Write for the Kinnear catalog.

Saving Ways in Doorways

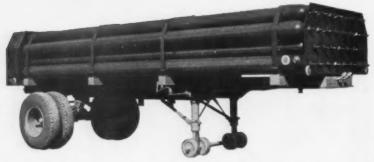
The KINNEAR Mfg. Co.

1760-80 Fields Avenue, Columbus 16, Ohio 1742 Yosemite Ave., San Francisco 24, Calif. Offices and Agents in All Principal Cities



#### with INDEPENDENT Gas Supply TRAILERS

TRANSPORTING - Argon - Carbon Dioxide - Helium-Nitrogen- Oxygen -Boron Trifluroide - Hydrogen ene. Trailer capacities from 187,000 cu. in. to 750,000 cu. in. water capacity. Trailer tubes ICC3A-2400 Specifications with 2400 PSIG Working Pressure.



Sizes and weights to meet all State requirements.

Can be mounted on bases for permanent storage.

INDEPENDENT ENGINEERING CO., Inc.





#### Safety:

Steel building safe in electrical storms.

Tests in the high voltage laboratory of Westinghouse Electric Corp. demonstrate the safety provided by steel buildings against lightning.

An Armco steel building 8 ft wide x 10-ft 4-in. long x 6-ft 8-in. high at the eaves, was erected in the laboratory. Two alternate ground connections were attached to a suitable grouding terminal.

#### Terminal Discharges Lightning

Surges of artificial lightning were discharged to the building from a terminal suspended from the laboratory ceiling. The surges arced across a distance of about 14-ft at 2,800,000v and 1600 amp.



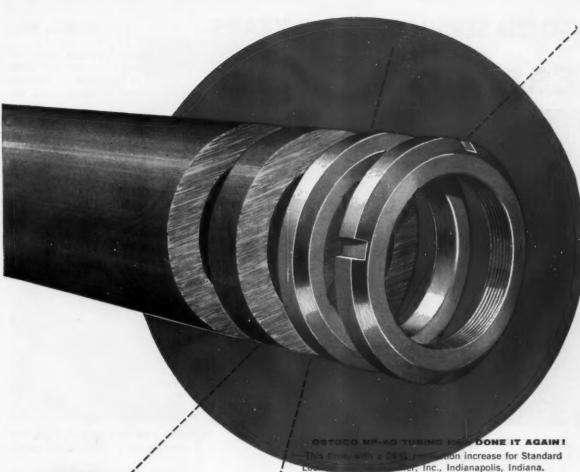
Lightning striking building did not hurt occupant in any way.

Such a discharge will split a 2 x 4 into several pieces, as demonstrated in one of the tests, or kill a person instantly. But nothing happened, either to the building or its contents.

#### Handling:

Conveyor moves white-hot molten calcium carbide.

White hot, 3700°F calcium carbide, flows into a carbide chiller conveyor at the National Carbide Co. plant, Calvert City, Ky. Link-Belt Co., manufacturer of the car-



**Aduction** increase at Lockwasher, Inc. Her switching to OSTUCO NP-60 tubing

Tubing experts from OSTUCO recently recommended a switch to NP-60 Tubing specially processed for machineability for Standard's locknut and lockwasher line used in ball and roller bearing applications.

Standard components find their way into electric motors, machine tools, automotive, aircraft, farm and construction equipment. Other companies, with equally diverse applications, report similar success with NP-60. If you are machining bearings, washers, collars, or any circular part, you'll do well to check into the merits of OSTUCO's new NP-60 seamless steel tubing.

#### GET NP-60 WITH "SINGLE-SOURCE SERVICE."

New NP-60 seamless tubing comes to you with OSTUCO'S unique "Single-Source Service"-experience and facilities for design and development, production and delivery all under one roof. Get together with a tubing expert for preliminary planning on NP-60's possibilities in your product. Contact your nearest sales office or write direct to the factory.



## OSTUCO TUBING

SEAMLESS AND ELECTRIC RESISTANCE WELDED STEEL TUBING-Fabricating and Forging

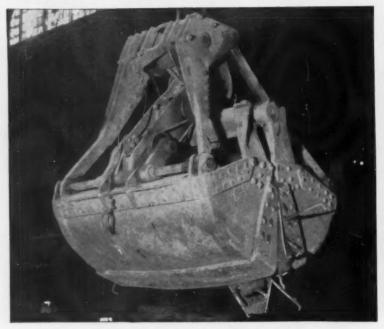
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CANADA, RAILWAY & POWER ENGR. CORP., LTD. EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY 225 Broadway, New York 7, New York

### **GOOD SERVICE FOR 10 YEARS**

FROM OUR

## **ERIE HOOK-ON BUCKETS**



#### STATES W. R. HODDER . . . . UNITED ENGINEERING AND FOUNDRY CO.

Ten years ago, United Engineering and Foundry Co. purchased an ERIE Single-Line, Hook-On Bucket. Their requirements were tough, but fair. They needed a durable, smooth-working clamshell to handle slag—a bucket fully controlled by their crane operator, from his cab.

United Foundry now has four ERIE Hook-On's at their Pittsburgh and Vandergrift, Pa. plants. Bucket No. 1 has required little maintenance, still gives fast operation and full payloads. Their other ERIE buckets are doing fine, too. Looking at the record, W. R. Hodder, Chief Plant Engineer, reports: "Our experience with ERIE buckets has been very satisfactory."

Check the ERIE—feature for feature—against any other hook-on clamshell made!

#### Plus Features of ERIE Buckets

- Hooks up and is in operation in less than five minutes. Detaches just as quickly.
- Extra heavy, balanced clams for equal crowding on both closing edges at all times.
- Narrow, rigid, ene-piece welded head shrugs off jars, eliminates wobble, minimizes maintenance.
- Lever arm and block and tackle design provides great closing power for full payloads.

ERIE

Write for Catalogs, Dept. A116

## ERIE STRAYER Co.

5116 GEIST ROAD

ERIE, PENNSYLVANIA

#### TECHNICAL BRIEFS

bide chiller, explains that the temperature of the material being handled in the chiller is approximately 1400°F higher than the 2300°F melting point of the cast iron buckets which convey the carbide.

#### Thin Layer Forms

An unusual property of calcium carbide forms a thin layer or "chill" of solidified material as it flows into the buckets on the



Cast iron buckets conveying the metal have a 2300°F melt point.

chiller. This layer effectively insulates the buckets from the intense heat of the molten carbide.

Link-Belt carbide chillers serve the four Elektrokemisk electric rotating furnaces at the Calvert City installation.

#### Materials:

### Expanded foam polyethylene is lightweight, buoyant.

Expanded foam polyethylene is now available from the American Agile Corp., Maple Heights, Ohio.

Offered in such semi-finished molded components as rings, blocks, rods and sheet, the new material may be used for heat and electrical insulation, sound proofing applications, and the like.

Unlike branch polyethylene whose specific gravity is .92, expanded polyethylene has a specific gravity of .46, or where required, .33. The material is unicellular, is very light in weight, is extremely buoyant, has a tensile strength of 500 to 600 psi.



# Vintage 1899 LOCOMOBILE GETS NEW LIFE WITH STAINLESS STEEL TUBES

• The owner of this pioneer steam-propelled "horseless carriage" selected Carpenter Stainless Tubing, Type 304, to re-tube the heat exchanger in his valuable 1899 Locomobile Steamer. The exchanger, shown being lowered into place, contains 308 tubes ½" dia. x 13½6" long. Previous carbon steel tubes lasted only 3 years, and required annual cleaning which is now eliminated. Possibly you can prolong equipment life in your plant by switching to Carpenter Stainless Steel Tubing or Pipe.



The Carpenter Steel Company Alloy Tube Division, Union, N. J.

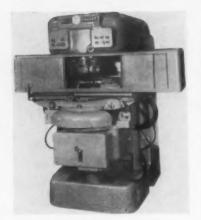
Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.-"CARSTEELCO"



Stainless Tubing & Pipe

N E W E Q U I P M E N T

New and improved production ideas, equipment, services and methods described here offer production economies...for more data use the free postcard on page 117 or 118.



#### Gear shavers feature new design, built-in controls

Featuring a new column design, a line of 8 and 12-in. rotary gear shaving machines boasts built-in pushbutton controls. Tunnels cast in the column provide space for electrical controls and enable compact flush-mounting of two control panels within easy reach of the operator. A separate cutter drive gear box is located in the top of the column. The 8-in. machine is equipped for semi-automatic loading. It will shave spur or helical gears up to four diametrical pitch

having 1 to 8-in. pitch diameters. The 12-in. models shave spur or helical gears up to four diametrical pitch with pitch diameters from 1 to 12-in. Both come in three types: (1) a universal machine for conventional gear shaving, including crowned and tapered gears, (2) one that resembles the universal, but does not have crowning or taper attachments, and (3) a unit for two-stroke, diagonal shaving only. National Broach and Machine Co.

For more data circle No. 33 on postcard, p. 117



#### Heat-treating furnace closely controls gradients

Designed for use where furnace gradients must be closely controlled, a new furnace has a temperature range from 300°F to 2200°F. It can handle many industrial heating operations, such as annealing, heat-treating, normalizing, annealing of glass, etc. Capacity is to heat 2000-lb of steel from 100°F to 2000°F in four hours. Its interior dimensions are: 40-in. wide x 36-in. high from top of hearth plate to spring of arch; 44½-in. to center of arch x 72-in. deep. Firing chamber temperature

gradients are easily controlled by means of a system of input controllers, zone located thermocouples, a recorder controller and a thermocouple selector switch. There are four zones, the input to each is separately controlled by means of an infinitely variable input controller so that fine gradient adjustments can be easily made and maintained. Control over heat-up time, cooling time and other heat curve adjustments may be made. L & L Mfa. Co.

For more data circle No. 34 on postcard, p. 117



#### Fan ventilators operate quietly at high speed

Two new centrifugal ventilators are designed for high efficiency and quiet operation at slow speeds. They are particularly recommended for applications where low noise levels are desirable. The fan ventilators are available in a V-belt drive for large capacities from 675 to 36,430 cfm and in a low profile model of spun aluminum for installations requiring lower capacities from 408 to 2508 cfm. All models carry the

new PFMA certified capacity label guaranteeing ratings. Both units have non-overloading, backward curved blade fan wheels with motors in separate, aircooled compartments insulated for quietness by resilient rubber vibration pads. Wide adaptability is provided with 13 basic sizes in the V-belt model and three basic damper types. The Burt Mfg. Co.

For more data circle No. 35 on postcard, p. 117

You get what you want with

# DANLY

PRESSES

#### PLANT PLANNERS

Get Better Production Balance, Easier Automation, Faster Installation

New Danly presses stand up to full capacity operation, single shift or around-the-clock, with minimum down-time...you get the performance you plan on. No more "production pile-up" with presses producing at less than full capacity or shut down entirely. Controls are "built-in" for convenient floor level adjustment, ideal for automation. designed for maximum safety.

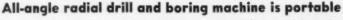
Each press is delivered pretested and ready to go, .. saving weeks of costly erection time.

Phone or write for complete catalog information. Get the whole story and see PRES for yourself.



DANLY MACHINE SPECIALTIES, INC. 2100 S. Laramie Ave., Chicago 50, III.





Widely varied shop work operations are performed with a portable all-angle radial drill and boring machine. It can be used for drilling, milling, counter-sinking, tapping, precision boring, reaming, facing, trepanning, etc. It is intended for use either as a self-contained production machine tool, mounted on its own base, or as a portable unit. The machine can be taken to the work site of heavy immobile work pieces. It is also designed for combination with other machines such as horizontal

boring and milling machines for simultaneous or successive operations. The boring head, movable vertically as well as horizantally, can be swung to any angle within the 360°, and locked into position. Available a c c e s s o r i e s include: precision compound table, precision chuck, tapping head, collet holder, adjustable boring head, facing and turning head, trepanning tool and boring bars. It is made in Switzerland by Swiss engineers. Alfred Hofmann & Co.

For more data circle No. 36 on postcard, p. 117

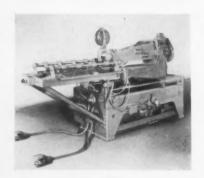


#### Air-operated shears cut ferrous and nonferrous strip

Air operated shears, previously used for cutting rounds and other bar stock, now cut ferrous and nonferrous strip. Floor space and weight requirements for the shears are low since no motor, gearing or clutch are required. They are available for cutting strip up to 3/16-in. thick in mild steel and widths from 24 to 84-in. The shears are recommended for cutting hot or cold carbon or stainless steel, copper, aluminum and other metals. Entirely operated by air, these

shears have controls furnished to suit company requirements. Controls may be hand operated, foot operated, automatic, air pilot or solenoid controlled. Shears are furnished complete with air filter, air lubricator, muffler, self-contained hydraulic shock cylinder and set screw adjustment for bottom knife. Model illustrated is an upcut type with 40-in. blades for cutting mild steel strip 38-in. x 12 gage. Curry Air Shear Corp.

For more data circle No. 37 on postcard, p. 117



#### Automatic stitcher speeds operation of continuous lines

An automatic stitcher permits the leading end of a new coil to be quickly joined to the trailing end of a preceding coil. It does not require skilled operators, and avoids usual high costs of automatic welding, the manufacturer says. The stitching setup allows high daily outputs and more continuous operation of annealing, galvanizing, painting, coating and

other continuous line processing. Its operation is entirely automatic. The operator aligns the trailing end of the lead coil and the lead end of the new coil in the stitcher with a 3 to 5-in. overlap and clamps them tight. The standard 36-in. stitcher joins with 14 locked stitchers in from 15 to 20 seconds. Herr Equipment Co.

For more data circle No. 38 on postcard, p. 117



#### Electronic gage measures any internal dimension

Any size internal dimension within the range 5 to 36 in. can be inspected to within several millionths of an inch quickly and accurately with a new electronic internal calibrating master. It is available as a kit, consists of a cylindrical shaped gage handle with a plastic grip that has a gage cartridge mounted in one end and an adjustable and interchangeable screw assembly at the other. A series of  $\frac{5}{6}$  in, diam bars

of different lengths thread into the gage handle to provide the wide range of adjustment. A second plastic grip gage handle, which clamps over the length bars, is provided to facilitate handling long assemblies. A transducer type pickup unit is connected to an electronic amplifier with dual amplifications of either 1000/2000; 2500/5000; 5000/10,000 or 10/20,000 to 1. Sheffield Corp.



WATCHING YOUR WEIGHT can be important—especially in the aircraft industry. Excess weight can reduce the range and payload of a plane. A major aircraft manufacturer uses M. Sonizon units to ultrasonically measure thickness of sheet and formed shapes. This controls weight by eliminating excessive thickness.

# Case Studies: NONDESTRUCTIVE TESTING SYSTEMS



Magnaglo and "black light" show up cracks as glowing indications on rough castings at a Peoria, Illínois foundry.

# How Nondestructive Testing Helps You Make Better Products . . . Cheaper



HEAT CRACKED THE JAW—The jaws of steel strapping machines must be reliable. Yet, following the heat treating, invisible cracks were discovered with Magnaglo as shown above. Immediate correction of the heat treat cycle eliminated the cracks. No further machine time or labor was expended on defective jaw parts, since none were made, and none scrapped!!

HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

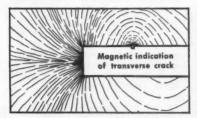


Write for complete details concerning any of the above case studies, or ask for our new booklet on "Lower Manufacturing Costs."

Most manufacturers can achieve definite, worthwhile savings by using one of the M testing systems for improved production control. These nondestructive inspection methods include: Magnaflux, for wet or dry magnetic particle inspection; Magnaglo, fluorescent particle inspection; Magnatest, eddy current electronic testing; Zyglo, fluorescent penetrant inspection; Spotcheck, dye penetrant inspection; Sonizon, for ultrasonic measurements; and others.

The M testing systems are equally effective for preventative maintenance or manufacturing inspection.

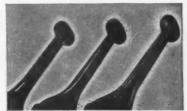
Most manufactured products contain one or more types of casting, forging weld-



HOW MAGNETIC FORCE DETECTS MECHANICAL DEFECTS

M nondestructive testing is based upon simple magnetic principles. A part to be tested is first magnetized—then magnetic powders or fluorescent particles in oil are applied. Surface defects ment, machined or formed part. Where cracks cannot be tolerated in the final product, maximum production economy must be obtained from the very outset. Defects must be discovered as early as possible in order to eliminate wasted effort in final processing or assembly.

Magnaflux methods pinpoint early defects, and help you eliminate their cause. This results in savings of time, labor and additional long range benefits from increased salvage and reduced amounts of scrap. For detailed information as to how one of the M inspection methods can help you produce better and save more, write or call for an interview with a Magnaflux engineer. No obligation, of course!



cause a break in the magnetic field—local magnetic poles cause particles to be held on part to mark extent of defect. Above—a Magnaglo indication on truck connecting rods.

Take Your Inspection Problems to the House of Answers

#### MAGNAFLUX CORPORATION

7302 Lawrence Avenue • Chicago 31, Illinois

New York 36 . Pittsburgh 36 . Cleveland 15 . Detroit 11 . Dallas 19 . Los Angeles 58



"BEST \*1530 WE EVER SPENT!"

## That's the price of this 5-Ton HANNIFIN Press\*

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

WRITE. Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

\*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



## HANNIFIN

Hannifin Corporation, 513 S. Wolf Rd., Des Plaines, III.

医动物性性性 医神经 医抗性病性 医性性性性 医二种性性性性性 医克里特氏征 医克里特氏病 医多种性 医二种性性 医二种性性 医二种性性 医二种性性

### Dependable is the word for



# Ruthman Gusher Coolant Pumps

Designed simply, with fewer moving parts to wear, Gusher Pumps are the last word in dependability. Pre-lubricated heavy-duty ball bearings require no further attention. There is no priming or packing necessary. Your Gusher pumps give you instant coolant flow from the moment the machine is started. Specify Ruthman Gusher Coolant Pumps.

Illustrated is a Model VH-6 WP Hammond Abrasive Belt Grinder equipped with a Ruthman Gusher Coolant Pump.



1809-1823 READING RD.



CINCINNATI 2, OHIO

#### Strap dispenser

Among the principal advantages listed for a new power strap dispenser are simplicity and safe operation. A handy push-button enables the operator to control the length of strap fed through the cutter jaws. When the right length of strap has passed through, the button is released and the strap halted. Pulling the cutter handle toward himself, the operator quickly severs the strap. This machine feeds strap through the cutter jaws at the rate of 6 to 10 feet per second. Cutting requires only 2 to 4 seconds. Signode Steel Strapping

For more data circle No. 40 on postcard, p. 117

#### Mini-chuck

Firmer gripping on full length or broken drills than the usual chuck used with angle head or snake drills is promised of a new drill chuck. The miniature chuck has a specially designed cut-back slot. This permits a full tension grip of the drill to prevent slippage and pull-outs. It is available in a full range of chuck sizes from No. 50 to "F" with adapters to fit spindles of standard angle head and snake drills. Beaver Tool Co.

For more data circle No. 41 on postcard, p. 117

#### Micro-scriber

Designed for last die layout, tool room marking, etc., a new lightweight scriber etches all metals including hardened steel, aluminum, corrugated sheet, brass, bronze and monel. It can also mark



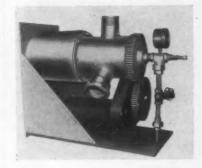
precious gems, glass, ceramics, plastics, etc. Its solid carbide tip is diamond ground and precision lapped. *Greist Mfg. Co.* 

For more data circle No. 42 on postcard, p. 117

#### Apparatus feeds and heats finely divided materials

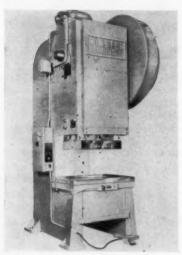
Finely divided materials are fed and heated with a new apparatus. It is recommended for applying controlled quantities of heat to iron oxides, molybdenum disulphides and similar ferrous and nonferrous materials. The unit operates by projecting a continuous stream of finely divided materials onto a concentric current of combustion gases or flame. It is readily usable with conventional rotating agitating type furnace chambers. In many cases, though, it is capable of functioning independently as an efficient feeding and heating unit. Heat treatment is controllable within wide temperature ranges. Treatments can be accomplished in either oxidizing or reducing atmospheres. Steel Processing Co.

For more data circle No. 43 on postcard, p. 117



#### Gap press

Of fabricated steel C-frame construction, this 110-ton capacity fixed base type press has little deflection under capacity loading. Unusually long press gibs and bronze lined ways, on the cast side, maintain accurate slide to bed parallelism. Area of slide is 21-in. front to back, 28-in, left to right, and area of bed is 27 x 42-in. Its slide adjustment is of the barrel type and may be either manual by ratchet wrench or air powered. A combination air friction clutch and brake unit is mounted on the crankshaft within the main drive gear. The drive gear itself turns on anti-friction bearings and is totally



enclosed running in oil. This arrangement makes it possible to offer variable speed operation, such as 37 to 74 spm with standard 5-in. stroke. This increases adaptability through suitable speed selection. Emerson H. Mook, Inc.

For more data circle No. 44 on postcard, p. 117



Give this versatile head the nod and save time and money these seven ways:

- You can use cup wheels for practically all clearence angles and thus produce a cutting edge on tools that lasts longer because it is
- You can keep the tooth rest on the center line of the cutter for practically all grinding on centers or in the work head.
- You can grind most cutters and reamers all over with a single set-up using the swivelling table and Pope tilting head.
- You can read all clearance angles directly in degrees from the scale provided on the head. No more mistakes.
- You can get the right clearance angle on such tough grinding jobs as slab milts, taper reamers, angular cutters and form tools.

- 6. You have one safe speed 3600 RPM for all whools generally used on cutter grinders. Heat checking of cutters is virtually elimi-
- You have a head that's so easy to adjust and use it saves you time and n you grind a tool.



ing price and delivery.

POPE MACHINERY CORPORATION had 1920



EQUIPMENT

HOUSEHOLD APPLIANCES

> ELECTRICAL FOUIPMENT

> > INDUSTRIAL EQUIPMENT

> > > FARM

IMPLEMENTS

Lansing Stamping

#### **Dustproof truck outlasts others**

Case histories indicate engine life in industrial lift trucks can be increased five times by proper dust protection. This improved truck is



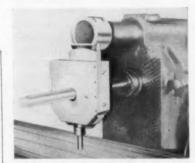
said to provide trouble free materials handling in locations containing atmospheric abrasives. It has a tandem air cleaning system which filters air going into the carburetor. It has a heavy duty oil filter. Also provided is a heavy duty air filter on the crankcase breather pipe. The truck's bottom is protected by a deflector plate which keeps particles from being drawn up into the engine compartment. This plate can be removed for servicing. The generator and voltage regulator are completely enclosed for preservation of commutator surfaces and extended brush and contact life. Yale & Towne Mfg. Co.

For more data circle No. 45 on postcard, p. 117

#### Mill-shape attachments turn miller into shaper

Now you can change horizontal milling machines into vertical shapers in a few minutes with attachments. These are built for precision high speed work. They fit directly on any regular horizontal milling machine arbor, close to the mill frame or as far out as

the arbor will permit. The conversion from horizontal to vertical takes as little time as changing a milling cutter. The attachment can be removed just as easily. It is



made in two models. One has a non-adjustable 21/2-in. stroke and no swivel features. Another has an adjustable stroke up to 3-in. This model swivels in two directions for taper shaping. Dorden & Co. For more data circle No. 46 on postcard, p. 117

#### Surface plates

Gray-granite surface plates now available have a 70. 70 silica content. The presence of a high percentage of quartz in these means extra hardness and natural relief areas which prevent sticking. Special lapping as required in diabase, for relief of ringing action, is eliminated. Longer wearing qualities and smoother action of these granites are now available in unlimited supply and size. Herman Stone Co.

For more data circle No. 47 on postcard, p. 117



851 63rd Street, Brooklyn 20, N. Y.

#### Portable lift table elevates pallet loads

A new Lift Table is designed to elevate skid or palletized loads. Small and compact enough to slide between the legs of any standard skid, it has high ratio of load capacity to size. Platform dimensions are 24 x 53 in. Collapsed height is only 71/4 in. Its capacity is 4000 lb, with a stroke or lift of 30 in. Hand or foot switches give the operator the opportunity of effecting the desired lift from floor level to a height of 371/4 in. in a single stage. For sheet feeding, on the other hand, it may be stopped at will to effect the total lift of the stock by multiple

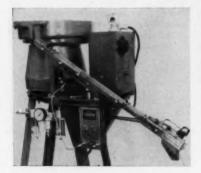
stages. Table is powered by a ½ hp. single phase, 115v ac, 60 cycle 1725 rpm. motor. Its scissor-type lift is controlled by an electro-hydraulic pump with built-in relief and solenoid valves. It has one pair of fixed wheels, a pull plate and a detachable dolly or skid spotter. South-Worth Machine Co.

For more data circle No. 48 on postcard, p. 117



#### Thread roll feeder

A new line of automatic thread roller feeders for eye bolts, set screws, thumb screws, hook bolts, studs, pins and other headless or non-symmetrical headed parts is now available. The machines are



completely adjustable. They handle five different eye bolt sizes, on the same track, from ½ in. OD of the eye by 1 in. long overall length through 1 in. OD by 3 in. overall length. The machine can be modified to handle an overall length of 6 in. Automation Development Corp.

For more data circle No. 49 on postcard, p. 117

#### **Cutting machine**

A new medium area oxyacetylene shape cutting machine can carry the latest automatic cutting equipment. This includes: motorized cutting torch holders, solenoid gas distribution system, and the electronic tracer. All are remotely controlled. Air Reduction Sales Co. For more data circle No. 50 on postcard, p. 117



ERIE Bolts • Studs • Cap Screws • Nuts
In Alloys • Stainless • Carbon • Bronze

Designers and engineers from every field of industry submit their exacting specifications to us for special fasteners to resist corrosion, extremes of temperature, tensile, fatigue, impact, and shear stresses. For more than 40 years our skilled craftsmen have met the requirements of construction and farm machinery, of transportation, refining and railroad equipment, the heavy machines of industry, pressure vessels, compressors, pumps, in widely diverse applications. We are prepared to serve you well. Send us your fastener specifications for prompt estimate.



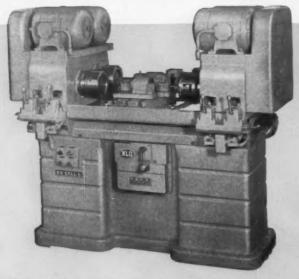
ERIE BOLT & NUT CO.

Erie, Pennsylvania

Representatives in Principal Cities

MAXIMUM PRODUCTION SPEEDS - LOWER COSTS WITH THESE MODERN

# Ex-Cell-O Precision Boring Machines



STYLE 1212-B. For identical or different operations at each end. When loading time of parts approximates the time of machining, a double-end machine practically doubles production.

These versatile Ex-Cell-O Precision Boring Machines bore, turn, face, counterbore, chamfer and groove.

Whichever model fits your production requirements, you'll find this large variety of precision operations will lower your costs—increase your profits.

All Standard Ex-Cell-O Precision Boring Machines can be equipped for work handling and ejecting operations, thus providing fast, automatic production at minimum cost.

Contact your local Ex-Cell-O representative who will provide all the facts about these machines, or write to Ex-Cell-O for a precision boring catalog.





# EX-CELL-O

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MANUFACTURERS OF PRECISION MACHINE TOOLS - GRINDING SPINDLES - CUTTING TOOLS - RAILROAD FINS AND BUSHINGS - DRILL JIG BUSHINGS - AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS - DAIRY EQUIPMENT

STEEL

Markets and Prices

#### The Iron Age SUMMARY...

Mid-East crisis forces steel buyers to take another look at inventories . . . Scrap market price jumps to all-time high . . . Automotive coming in strong . . . '57 record seen.

A New Look . . . The Middle East explosion is forcing steel buyers to take another look at their inventories this week. And pressure for delivery and position on steel order books is starting to mount.

The scrap market has already reacted violently. Prices were pushed up in every important consuming area as steel producers scrambled to rebuild their stocks. The IRON AGE Steel Scrap Composite price zoomed to an all-time high.

Steel consumers are forgetting about the conservative inventory policy that prevailed before Israel attacked Egypt. Not the least of these is automotive. The whole pattern of steel buying is changing to a faster tempo. If international tensions worsen, some steel buyers will be trampled in the rush.

Behind The Push... Virtually every steel product was tight—and growing tighter—before the Egyptian war and the revolt in Eastern Europe. Plate, structural, and hot-rolled bar inventories were badly out of balance. Hot-rolled sheets were in the same boat. Cold-rolled sheets, used extensively by automotive, are tightening up fast, will hit a real pinch in the months ahead.

Factors behind the growing steel crisis include: (1) the probability that a big oil tanker program will be expedited, (2) the chance that the freight car program will be singled out for more speed, and (3) the coming push for more steel by auto producers.

Behind-the-scenes pressure for reimposition of controls on steel is growing. Controls advocates have set their sights chiefly on plates and structurals. A go-ahead on the tanker program would give them more ammunition. But offsetting this is the Administration's objections to controls plus past experience to prove that controls do not produce one pound of steel.

New Record In '57? . . . Meanwhile, an Iron Age survey of major consuming industries indicates that the 1957 steel market will be much stronger than had been indicated a few weeks ago. It looks now as though production will run between 118 and 120 million tons for a new record.

Some reasons for this change are (1) turnabout in inventory policy from one of reduction to one of maintaining or increasing stocks, (2) strong outlook for construction, freight cars, capital equipment, and automotive, and (3) a revival in appliance and farm implements.

#### Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,486	2,498	2,498	2,320
Ingot Index				
(1947-1949=100)	154.8	155.5	155.5	153.0
<b>Operating Rates</b>				
Chicago	101.0	103.0*	101.0	99.0
Pittsburgh	101.0	101.0	101.0	102.0
Philadelphia	107.0	107.5	105.0	103.0
Valley	98.0	98.0	98.0	0.101
West	104.0	105.0*	105.0	96.0
Detroit	104.0	106.0*	106.0	95.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	102.0	105.0*	103.0	103.0
Birmingham	96.0	96.0	96.0	103.0
S. Ohio River	97.0	84.0*	0.88	87.0
Upper Ohio R.	104.0	105.0*	104.0	103.0
St. Louis	107.0	105.0	106.0	97.0
Northeast	100.0	100.0	100.0	97.0
Aggregate	101.0	101.5	101.5	100.0

#### Prices At A Glance

cents	per	1b	unless	otherwise	noted

feeting ber in among amount				
Composite price	This Week	Week Ago	Month Ago	Year
Finished Steel, base Pig Iron (Gross Ton) Scrap, No. I hvy	5.622 \$63.04	5.622 \$63.04	5.622 \$63.04	5.174 \$59.09
(gross ton)	\$59.83	\$57.50	\$56.17	\$44.83
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper, electrolytic	40.00	40.00	40.00	43.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Magnesium ingot	36.00	36.00	36.00	33.25
Nickel, electrolytic	64.50	64.50	64.50	64.50
Tin, Straits, N. Y.	111.25	108.25	104.00	96.37
Zinc, E. St. Louis	13.50	13.50	13.50	13.00

\*Revised

#### Record Steel Use Seen in '57

Consumption will reach new heights, U. S. Steel's B. E. Estes states . . . Automotive, construction and machinery among the big users . . . Shipbuilding will spurt.

• A RECORD YEAR for steel consumption in 1957 is seen by B. E. Estes, Director of Commercial Research for U. S. Steel Corp.

In this respect, Mr. Estes is in agreement with IRON AGE'S Tom Campbell who foresees a possible new record steel output of 118-120 million tons. The present record of 117 million tons was set in 1955.

While not quite that optimistic, Mr. Estes cites three factors—high personal income, rising consumer spending and substantial gains in business spending—as providing underlying economic strength.

Here's how he details the picture for steel's major markets: Automotive: "Passenger car output in '56 will just miss 6 million units, as compared with almost 8 million units in '55. Our preliminary thinking for '57 centers on 6.8 million cars, a substantial increase from this year's level."

Construction: "... physical volume rising 2 pct above the 1955-56 record. Principal impetus ... will come from strong demand for industrial and commercial construction, community facilities, and the consistent growth in public utilities."

Machinery . . . "will reach a second consecutive record high in '57, although the rate of growth will not be so rapid as it has been during '56."

Containers: "Steel consumption should increase slightly in 1957, with all of the gain concentrated in demand for metal cans."

Appliances ". .. we believe total appliance and furniture output in 1957 will just about equal this year's rate."

Freight Cars: "Heavy demand . . . combined with lower-than-required production have resulted in serious car shortages during '56. We expect some improvement in output next year with a monthly building rate of 6000 cars and a total for the year about double the below-normal years of 1954 and 1955."

Farm Equipment: "Production and sales of agricultural equipment should improve in 1957 in line with higher farm income."

Oil and Gas: "Our forecasted increase for 1957 is based on a 3 pct gain in domestic demand (for oil and gas), in addition to a continuation in a trend toward an increasing proportion of exploratory wells at greater depths."

Shipbuilding: "... will have its best year since the Korean War... uncertainties engendered by the Suez situation make any quantitative estimates of its effect on orders for merchant shipping uncertain..."

Mining, Aircraft and Ordnance: "All will register gains over '56, although aircraft and ordnance steel requirement will be well below the Korean War level."

SHEET AND STRIP . . . Coldrolled sheet starting to fill up for January and February at Cleveland but mills are holding open tonnage for autos. Hot-rolled sheets very tight. All orders on tight allocation

#### **Purchasing Agent's Checklist**

CONTROLS: Will Suez crisis mean government regulations?...p. 58

PURCHASING: Castings buyers list quality as one of their prime wants in foundry survey..........p. 61

RAW MATERIALS: Suez turmoil threatens tin supply ..... p. 62

 basis. Planned schedules on coldrolled strip are long but auto plant deferments continue to cut actual cutput by over half in some cases.

Flat rolled products are building up to a pinch in first half of next year, Pittsburgh reports. Only softness has been automotive demand for coldrolled sheet and strip. Even with this situation, one large mill reports selling all the steel it can make.

Capacity operations are being talked about at Chicago for the first quarter with light carryovers of cold rolled sheet and heavy carryovers of hot rolled sheet. Carryover prospect: ne more than two weeks in cold-rolled and no more than four weeks in hot-rolled. Conversion of hot-rolled sheet continues. No strong auto pressure yet, but full allotments taken for fourth quarter and stronger first quarter activity expected.

PLATE AND STRUCTURALS... Cleveland firm importing about 400 tons of Swedish I-beams to keep in operation and paying about \$60 per ton over domestic rate.

At Chicago structurals being turned out by new Bethlehem mill are helping a little. Conversion of even standards seems definite for the first quarter.

REPUBLIC RECORD . . . In the Cleveland area, Republic Steel set an all-time monthly production record of 941,800 tons. Best previous month was March, 1953 when 929,900 tons were turned out. Republic has also announced its 680 ton per day blast furnace at Canton, O. is being taken cut of production for about 45 days for relining.

CONVERSION . . . With metal demand terrific, most blast furnaces at Chicago are operating at full force. However, soaking pit capacity is a problem. Conversion inquiries are coming in there from both coasts, with ingots and billets for conversion being marketed on a regular monthly basis.

WIRE... Overall wire business at Cleveland is showing some pickup although automotive, appliances and furniture buyers continue not too active. Merchant wire continues in the seasonal doldrums after a subnormal year and only a slight pick-up is seen next year. Manufacturers' wire is generally in easy demand and supply although some special coatings are extended out to 2 months.

Construction products and merchant wire are lagging seasonally in Pittsburgh.

#### **Comparison of Prices**

(Effective Nov. 6, 1956)

Steel prices on this page are the of major producing areas: Pi Youngstown.	ttsburgh,	Chicago,	Gary, Cl	eveland,
Price advances over previous declines appear in Italics.	week are	printed	in Heavy	Type;
weerines appear in riusics.	Nov. 6	Oct. 30	Oct. 9	Nov. 8
	1956	1956	1965	1955
Flat-Rolled Steel: (per pound)	1330	1220	1369	1999
Hot-rolled sheets	4.675¢	4.675¢	4.675€	4.325€
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.80	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870		
	4.87	4.87	6.870	6.29
Plates, wrought iron			4.87	4.52
	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	47.50	47.50	47.50	44.50
Tin and Terneplate: (per base be	ox)			
Tinplate (1.50 lb.) cokes	89.95	39.85	\$9.85	89.05
Tinplates, electro (0.50 lb.)		8.55	8.55	7.75
Special coated mfg. ternes	9.20	9.10	9.10	7.85
appears consect mig. termes	3.20	0.10	0.10	1.00
Bars and Shapes: (per pound)				
Merchant bars	5.075d	5.075¢	5.075é	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	40.75	40.75	40.75	38.25
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
	11004		11204	0.204
Rails: (per 100 lb.)				
Heavy rails	\$5.075	\$5.075	\$5.075	\$4.725
Light rails	6.00	6.00	6.00	5.65
Semifinish Steel: (per net ton)				
Rerolling billets	\$74.00	\$74.00	\$74.00	\$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound	1			
Wire rods	5.80¢	5.80¢	5.80d	5.025¢
Chelm	4.225	4.225	4.225	
Skelp	4.220	4.220	4.225	4.225

el prices on this page are the average of various foh

ė	5.622€	5.174#	† Tentative.	‡ Avera
1	urnaces an	averages d foundry	for basic iron at iron at Chicago, ey and Birminghar	Phila-

Oct. 30 Oct. 9 Nov. 8 \$67.76 63.00 67.17 59.00 63.00 68.00 67.17 59.00 68.00 59.00 62.93 55.00 66.84 66.84 62.50 62.50 58.50 68.00 63.00 59.00 63.00 59.00 11.75¢ 11.75¢ 9.50€ Pig Iron Composite: (per gross ton)
Pig iron ...... \$68.04 \$63.04 263.04 \$59.09 
 Serap:
 (per gross ton)
 861.59

 No.
 1 steel, Pittsburgh
 \$61.59

 No.
 1 steel, Phila.
 area
 57.50

 No.
 1 steel, Chicago
 60.50

 No.
 1 bundles, Detroit
 69.50

 Low phos.
 Youngstown
 68.50

 No.
 1 mach'y cast, Pittsburgh
 61.50

 No.
 1 mach'y cast, Philadel'a.
 58.00

 No.
 1 mach'y cast, Chicago
 56.50
 46.50 42.50 57.50 57.50 56.50 56.50 56.50 49.00 64.50 59.50 57.50 57.50 65.50 49.00 59.50 58.00 56.50 50.50 48.50 53.50 Steel Scrap Composite: (per gross ton)
No. 1 heavy melting scrap .... \$59.83 \$56.17 \$44.83 Coke, Connellsville: (per net ton at oven) Furnace coke, prompt ...... \$14.50 Foundry coke, prompt ..... \$17-18 43.00 43.00 96.375 13.00 15.80 27.10 15.30 24.40 64.50 64.50 36.00 33.00 33.25

Steel Scrap Composite Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Phila-delphia and Chicago.

#### Finished Steel Composite Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Dollars per gross ton, f.o.h., subject to switching charges. PIG IRON

#### STAINLESS STEEL

5.622d

← To identify producers, see Key on P. 164→

Base price cents per lb. f.o.b. mill.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	64.50	65.00	65.50	66.00	
Birdsboro, Pa. B6	64.50	65.00	65.50	66.00	
Birmingham R3.	58.50	59.00*			
Birmingham W9.	58.50	59.00°	63,00		
Birmingham U4.	58.50	59.00*	63.00		
Buffalo R3	62.50	63.00	63.50	64.00	
Buffalo H1	62.50	63.00	63,50		
Buffalo W6	62.50	63.00	63.50	64.00	
Chester P2	64.50	65.00	65.50		
Chicago 14	62.50	63.00	63.00	63,50	
Cleveland A5	62.50	63.00	63.00	63.50	67.50
Cleveland R3	62.50	63.00	63.00	63.50	
Duluth 14	62.50	63,00	63.00	63.50	67.50
Erie 14	62.50	63,00	63.00	63.50	67.50
Everett M6		63.75	64.25		4.144
Fontana K1	70.00	70.50			200000
Geneva, Utah C7	62.50	63.00			
Granite City G2.	64.40	64.90	65.40		
Hubbard Y/			63.00		
Lone Star L3	58,501	59.001	00.00		1111111
Midland CII	62.50	00.00,			
Minneaus C6	64.50	65.00	65.50		
Monessen P6	62.50				
Neville Is. P4	62.50	63.00	63.00	63.50	67.50
N. Tanawanda TI		63.00	63.50	64.00	01.50
Pittsburgh UI	62.50		63.00	63.50	
Sharpaville S3	62.50	63.00	63.00	63.50	
So. Chicago R3	62.50	63.00	63.00	43.30	*****
Steellen B3	64.50	65.00	65.50	66,00	70.56
Swedeland A2	64.50	65.00	65.50	65,50	10.30
Toledo 14	62.50	63.00	63.00	63.50	
Trey, N. Y. R3	64.50	65.00	65.50	66.00	
Youngstown YI.	64.30		63.00	63,50	

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingets , rerell.	19.75	21.00	20.50	22.00	-	23.25	35.25	28.25	32.75	-	16.00	27.75	16.25
Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00		20.75	-	21.00
Bill ets, forging	-	33.00	33.75	34.00	37.00	36.00	56.25	42.25	50.25	30.75	27.25	27.75	27.75
Bars, struct.	39.00	39.25	40.50	40.75	43.75	43.00	66.75	50.25	59.00	36.25	32.50	33.00	33.00
Plates	-	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	33.75	35.50	34.50
Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Strip, hot-rolled	33.00	35.75	34.00	36.75	-	39.75	63.50	48.75	58.25	-	29.75	-	30.75
Strip, cold-rolled	41.50	45.25	43.75	47.50	52.00	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Wire CF: Red HR	-	37.25	38.35	38.75	41.50	40.75	63.50	48.00	56.25	34.50	31.00	31.50	31.50

#### STAINLESS STEEL PRODUCING POINTS:

Skects: Midland, Pa., CII; Brackenridge, Pa., A3; Butler, Pa., A2; Vandergrift, Pa., UI; Washington, Pa., W2, J2; Baltimore, E1; Middletown, O., A1; Massillon, O., R3; Gary, UI; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayns, I4; Philadelphia, D5.

Strip: Midland, Pa., Cl1; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A1; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Harrison, N., J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., 47; Wallingford, Conn., U3 (plus further conversion extras); W1 (.25 per lb. higher); New Bedford, Mass., R6; Gary, U1 (.25 per lb. higher)

Bar: Baltimore, A1; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., 12; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A1; Massillon, O., R3; S. Chicago, U1; Syracuse, N. Y., C1; Watervillet, N. Y., A3; Waukegan, A5; Canton, O., 75; Fr. Wayne, I4; Philadelphia, D; Dettroit, R8; Cary, U1.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J. D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1. Plates: Brackenridge, Pa., A3; Chicago, UI; Munhall, Pa., UI; Midland, Pa., CII; New Castle, Ind., I2; Middletown, A7; Washington. Pa., I2; Cleveland, Massillon, R3; Coatesville, Pa., CI5; Philadelphia, D5; Vandergrift, Pa., UI; Gary, UI.

Forgings billets: Midland, Pa., CII; Baltimore, A7; Washington, Pa., J2; McKeesport, FI; Massillon, Canton, O., R3: Watervliet, A3; Pittsburgh, Chicago, UI; Syracuse, CII; Detrois A5; Munball, Pa., S. Chicago, UI.

#### Scrap Heads for the Ceiling

Surge in Pittsburgh and Midwest brings another new price record . . . Composite resumes new record levels after slight October lapse . . . No downturn in near future.

• SCRAP PRICES went over the top again, picking up where they left off last September when the market slipped somewhat from its all time record high level.

On the basis of a surging market in the Midwest and sustained strength elsewhere, The Iron Age Composite Price again broke through to a new record high, climbing past the peak of \$58.83 set Sept. 11-18 to a new record of \$59.83.

Record high prices show no sign of dropping off while the steel market continues at its present high rate. Mill inventories are not at a high level; some will have to pay higher prices to maintain adequate levels. Some smaller mills are seriously concerned over the high prices, are trying to utilize a greater tonnage of No. 2 grades, which is tending to close the gap between No. 1 and No. 2 grades.

The Suez crisis has stimulated some talk about adversely affecting the export market, but there is as yet no indication of export dropping off. In fact, Europe's need for scrap will be increased, not lessened, by the conflict.

Strength of the market is universal, but greatest pressure is centered in Pittsburgh and farther west. One major consumer in the Cleveland area came into the market after a sustained absence, contributing to the higher price levels there and elsewhere.

In Chicago, higher prices were generally attributed to smaller mills, but large consumers were having no luck at lower prices and broker buying was also at higher levels than official mill prices.

Pittsburgh . . . Prices of openhearth grades have jumped \$2 to \$4 in this area as purchases by mills outside the district are draining these grades . . . Dealers are being quoted \$64 on track for shipment out of the district. A mill on the fringe of the district attempted to buy No. 1 heavy melting at a dealer price of \$61, but was forced to raise its price to \$63 a few days later. Nearby industrial bundles went for more than \$72, which is about \$4 over last month's price. On the basis of this activity, prices of No. 1 openhearth grades climbed \$4, with No. 2 grades and turnings also up.

Chicago . . . A scattering of mill offers to buy at existing prices met virtually no success, after a market breakthrough that caused some scrap movement out of the area, boosted broker buying prices, and saw spot sales advance the entire list several dollars. Mill attempts to purchase No. 1 factory bundles at \$65-\$66, electric furnace at \$65, and No. 1 railroad at \$65 met with little enthusiasm and brokers were paying well over these offering prices to cover old orders. Expected higher prices and strong out-of-area movement encourage dealers to hold what they have.

Philadelphia . . . Strength from the Midwest had not yet reached this market in terms of higher prices. No new purchases were made and the market awaited a test from an area consumer. In spite of the lack of new activity, the market tone is strong and new purchases will probably bring higher prices.

New York . . . Strong domestic demand boosted price of No. 1 heavy melting steel \$1 to a top of \$53. Other steelmaking grades have not yet been pushed up, but the trade expects it shortly. Blast furnace demand has edged turnings up across the board.

Detroit . . . The market advanced sharply this week on the basis of local mill orders and broker buying. No. 1 grades are up \$4, No. 2 grades even more. Reason behind the sudden upsurge is that brokers didn't make their requirements on automotive lists, are now trying to recover. In addition, the water shipping season will soon be ended.

Cleveland . . . Consumers in Cleveland and the Valley rushed into the market, boosting the price of prime grades \$2 in the Valley and \$1 in Cleveland. Automotive lists jumped with major tonnage bringing \$70 on track locally and some being brought in from Michigan for over \$73 delivered.

Birmingham ... Most of the openhearth scrap is moving north or to export. The major openhearth purchaser in Alabama has been out of the market since early August and has held up shipments on some purchases made at that time. An Atlanta mill is still receiving shipments on October orders and has not indicated when it will buy again.

St. Louis . . . The market continues strong with prices generally unchanged. Shipments continue to equal the melt and it is expected that existing orders will be completed within the next ten days when there may be a change in prices.

Cincinnati . . . Prices went up \$3 after an area mill voluntarily increased its regular monthly buying price following increases in adjacent areas. Foundry market is also strong.

Buffalo . . . Small quantities of openhearth moving at higher prices brought prices up \$1 across the board. Mill inventories are high, but dealer stocks remain low. Most of the strength comes from outside the area.

Boston . . . The market has strengthened with all area purchasers back in the market. Export continues slow, with demand off and facilities limited. Openhearth grades are up \$1 on the strength of new purchases and some blast furnace grades also advanced.

West Coast . . . Prices dropped from \$1 to \$3 on most grades. Mills report good scrap inventories. New Japanese scrap contract calls for almost 2 million tons. Most of it will go through West Coast or Gulf ports. Contract eliminates escalator clause.



IMPORT & EXPORT - LIVINGSTON & SOUTHARD, INC., 99 Park Ave., New York, N. Y. Coble Midross FORENTRACO

#### Pittsburgh

No. 1 hvy. melting \$	61.00 to	\$62.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 bundles	61.00 to	62.00
No. 2 bundles	49.00 to	50.00
Machine shop turn	41.00 to	42.00
Mixed bor, and ms, turn	41.00 to	42.00
Shoveling turnings	46.00 to	47.00
Cast iron borings	46.00 to	47.00
Low phos. punch'gs plate	70.00 to	71.00
Heavy turnings	55.00 to	56.00
No. 1 RR. hvy. melting	69.00 to	
Scrap rails, random lgth	78.00 to	
Rails 2 ft and under	79.00 to	80.00
RR. steel wheels	73.00 to	
RR. spring steel	73.00 to	
RR. couplers and knuckles	73.00 to	
No. 1 machinery cast	61.00 to	62.00
Cupola cast	53.00 to	
Heavy breakable cast	51.00 to	52.00

#### Chicago

No. 1 hvy. melting	60.00	to	\$61.00
No. 2 hvy. melting	51.00	to	52.00
No. 1 factory bundles	67.00	to	68.00
No. 1 dealers' bundles	61.00	to	62.00
No. 2 dealers' bundles	44.00	to	46.00
Machine shop turn	39.00	to	40.00
Mixed bor, and turn	41.00	to	42.00
Shoveling turnings	41.00		42.00
Cast iron borings	41.00		42.00
Low phos. forge crops	72.00		73.00
Low phos. punch'gs plate	69.00	to	70.00
Low phos. 3 ft and under	68.00		69.00
No. 1 RR. hvy. melting	67.00		68.00
Scrap rails, random lgth	76.00		77.00
Rerolling rails	88.00		89.00
Rails 2 ft and under	86.00		87.00
Locomotive tires, cut	72.00	to	73.00
Cut bolsters & side frames	72.00		73.00
Angles and splice bars	77.00		78.00
RR. steel car axles	90.00	to	91.00
RR. couplers and knuckles	71.00	to	72.00
No. 1 machine cast	56.00		57.00
Cupola cast	51.00	to	52.00
Heavy breakable cast	46.00	to	47.00
Cast iron brake shoe	47.00	to	48.00
Cast iron wheels	56.00		57.00
Malleable	71.00		
Stove plate	47.00		48.00
Steel car wheels	72.00		73.00

#### Philadelphia Area

rniidaeipnia Area		
No. 1 hvy. melting\$	57.00 to	\$58.00
No. 2 hvy, melting	47.00 to	48.00
No. 1 bundles	57.00 to	58.00
No. 2 bundles	47.00 to	48.00
Machine shop turn	40.00 to	41.00
Mixed bor. short turn	40.00 to	
Cast iron borings	40.00 to	41.00
Shoveling turnings	44.00 to	
Clean cast chem. borings	46.00 to	
Low phos. 5 ft and under.,	61.00 to	
Low phos. 2 ft and under	62.00 to	
Low phos. punch'gs	62.00 to	63.00
Elec. furnace bundles	60.00 to	61.00
Heavy turnings	52.00 to	
RR. steel wheels	69.00 to	
RR. spring steel	69.00 to	70.00
Rails 18 in. and under	79.00 to	80.00
Cupola cast	52.00 to	54.00
Heavy breakable cast	55.00 to	
Cast iron car wheels	64.00 to	
Malleable	68.00 to	
Unstripped motor blocks	44.00 to	
No. 1 machinery cast	57.00 to	59.00

#### Cleveland

No. 1 hvy. melting\$	64.50 to	\$65.50
No. 2 hvy, melting	48.00 to	0 49.00
No. 1 bundles	64.50 to	65.50
No. 2 bundles	41.00 to	0 42.00
No. 1 busheling	64.50 t	0 65.50
Machine shop turn	34.00 t	0 35.00
Mixed bor. and turn	38.00 t	0 39.00
Shoveling turnings	38.00 t	0 39.00
Cast iron borings	38.00 t	0 39.00
Cut struct'r'l & plates, 2 ft		
& under	67.00 t	
Drop forge flashings	65.50 t	
Low phos. punch'gs, plate.	65.50 t	
Foundry steel, 2 ft & under	62.00 t	
No. 1 RR. heavy melting	68.00 t	
Rails 2 ft and under	83.00 t	
Rails 18 in, and under	84.00 t	
Railroad grate bars	49.00 t	
Steel axle turnings	44.00 t	
Railroad cast	61.00 t	
No. 1 machinery cast	58,001	
Stove plate	55.00 1	
Malleable	71,00	to 72.00

#### Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

#### Youngstown

No. 1 hvy. melting\$66.00	to	\$67.00
No. 2 hvy. melting 50.00	to	51.00
No. 1 bundles 66.00	to	67.00
No. 2 bundles 47.00		
Machine shop turn 34.00	to	35.00
Shoveling turnings 40.00	to	41.00
Cast iron borings 40.00	) to	41.00
Low phos. plate 68.00	) to	69.00

#### Buffalo

No. 1 hvy. melting	55.00	to	\$56.00
No. 2 hvy. melting	45.00	to	46.00
No. 1 busheling	55.00	to	56.00
No. 1 bundles	55.00	to	56.00
No. 2 bundles	42.00	to	43.00
Machine shop turn	30.00	to	31.00
Mixed bor. and turn	32.00	to	33.00
Shoveling turnings	34.00	to	35.00
Cast iron borings	32.00	to	33.00
Low phos. plate	59.00	to	60.00
Scrap rails, random lgth	57.00	to	58.00
Rails 2 ft and under	77.00	to	78.00
RR. steel wheels	60.00	to	61.00
RR. spring steel	60.00	to	61.00
RR. couplers and knuckles	70.00	to	71.00
No. 1 machinery cast	52.00	to	53.00
No. 1 cupola cast	48.00	to	49.00

#### Detroit

Brokers buying prices per grou	s ton.	on	care
No. 1 hvy. melting			
No. 2 hvy. melting	50.00	to	51.0
No. 1 bundles, openhearth.	60.00		61.0
No. 2 bundles	40.00	to	41.0
New busheling	59,00		60.0
Drop forge flashings	58.50	to	59.5
Machine shop turn	29.00	to	30.0
Mixed bor. and turn			33.0
Shoveling turnings	32.00	to	33.0
Cast iron borings	32.00	to	33.0
Low phos. punch'gs, plate	59.00	to	60.0
No. 1 cupola cast	51.00	to	52.0
Heavy breakable cast	44.00	to	45.0
Stove plate	45.00	to	46.0
Automotive cast	54.00	to	55.0

#### St. Louis

JII MUMIS			
No. 1 hvy. melting \$	52.00	to	\$53.0
No. 2 hvy. melting	45.00	to	46.0
No. 1 bundles	55.00	to	56.0
No. 2 bundles	41.00	to	42.0
Machine shop turn	35.50	to	36.5
Cast iron borings	37.50	to	38.5
Shoveling turnings	37.50	to	38.5
No. 1 RR. hvy. melting	62.50	to	63.5
Rails, random lengths	79.00	to	80.0
Rails 18 in. and under	83.00	to	84.0
Locomotive tires uncut	64.00	to	65.0
Angles and splice bars	68.00	to	69.0
Std. steel car axles	78.00	to	79.0
RR. specialties	66.50	to	67.5
Cupola cast.	52.00	to	53.0
Heavy breakable cast	44.50	to	45.5
Cast iron brake shoes	50.00	to	51.0
Stove plate	44.00	to	45.0
Cast iron car wheels	56.00	to	57.0
Rerolling rails	89.00	to	90.0
Unstripped motor blocks	43.00	to	44.0

#### Boston

Brokers buying prices per gree	s ton, on	cars:
No. 1 hvy. melting	50.00 to	51.00
No. 2 hvy. melting	38.50 to	39.50
No. 1 bundles	50.00 to	51.00
No. 2 bundles	36.50 to	37.50
No. 1 busheling	50.00 to	51.00
Elec. furnace, 3 ft & under	53.00 to	54.00
Machine shop turn,	30.00 to	31.00
Mixed bor, and short turn.	31.00 to	32.00
Shoveling turnings	34.00 to	35.00
Clean cast chem. borings	34.00 to	35.00
No. 1 machinery cast	45.00 to	46.00
Mixed cupola cast	41.00 to	42.00
Heavy breakable cast	44.00 to	45.00
Stove plate	39.00 to	
Unstripped motor blocks	32.00 to	33.00

#### **New York**

Brokers buying prices per gros	s ton, on	cars:
No. 1 hvy. melting\$		
No. 2 hvy. meiting	42.00 to	43.00
No. 2 bundles	40.00 to	41.00
	31.50 to	
	31.50 to	32.50
Shoveling turnings	37.50 to	38.50
	35.00 to	36.00
	51.00 to	52.00
Mixed yard cast	47.00 to	48.00
Charging box cast	47.00 to	48.00
Heavy breakable cast		48.00
Unstripped motor blocks	37.00 to	38.00

#### **Birmingham**

No. 1 hvy. melting\$	43.00 to	\$44.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 bundles	43.00 to	44.00
No. 2 bundles	35.00 to	36.00
No. 1 busheling	43,00 to	44.00
Machine shop turn	34.50 to	35.50
Shoveling turnings	35,50 to	36.50
Cast iron borings	25.00 to	26.00
Electric furnace bundles	52.00 to	53.00
Bar crops and plate	59.00 to	60.00
Structural and plate, 2 ft	57.00 to	58.00
No. 1 RR. hvy. melting	56.00 to	57.00
Scrap rails, random lgth	69.00 to	70.00
Rails, 18 in. and under	74.00 to	75.00
Angles & splice bars	66.00 to	67.00
Rerolling rails	77.00 to	78.00
No. 1 cupola cast	51.00 to	52.00
Stove plate	51.00 to	52.00
Charging box cast	40.00 to	41.00
Cast iron car wheels	45.00 to	46.00
Unstripped motor blocks	44.00 to	45.00
Mashed tin cans	15.00 to	16.00
Elec. furnace, 3 ft & under	50.00 to	51.00

#### Cincinnati

Brokers buying prices per gros	s ton.	on	cars:
No. 1 hvy. melting \$	59.00	to \$	60.00
No. 2 hvy. melting	49.00	to	50.00
No. 1 bundles	59.00	to	60.00
No. 2 bundles	43.00	to	44.00
Machine shop turn	39.00	to	40.00
Mixed bor, and turn	37.50	to	38.50
Shoveling turnings	42.00	to	43.00
Cast iron borings	37.50	to	38.50
Low phos. 18 in. & under	64.00		65.00
Rails, random lengths	69.00		70.00
Rails, 18 in. and under	78.00	to	79.00
No. 1 cupola cast	48.00		49.00
Hvy. breakable cast	47.00		48.00
Drop broken cast	58.00	to	59.00

#### San Francisco

No. 1 hvy. melting	\$54.00
No. 2 hvy. melting	52.00
No. 1 bundles	
No. 2 bundles	
Machine shop turn	
Cast iron borings	W. E. O. O.
No. 1 RR. hvy. melting No. 1 cupola cast	00.00
No. 1 cupola cast	00.00

#### Los Angeles

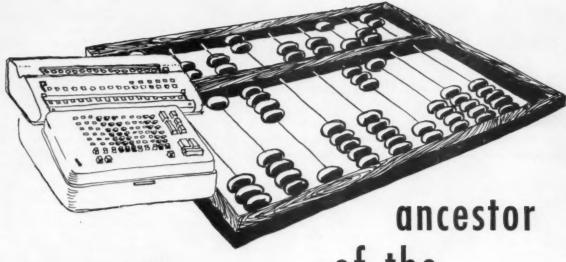
No. 1 hvy. melting	\$54.00
No. 2 hvy. melting	52.00
No. 1 bundles	53.00
No. 2 bundles	42.00
Machine shop turn	35.00
Shoveling turnings	38.00
Cast iron borings	35.00
Elec. furn. 1 ft and under	00.00
(foundry)	66.00
No. 1 RR. hvy. melting	54.00
No. 1 cupola cast	60.00

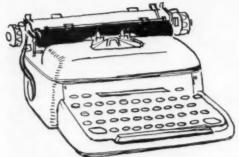
#### Seattle

Searrie	
No. 1 hvy. melting	\$54.00
No. 2 hvy. melting	51.00
No. 2 bundles	35.00
No. 1 cupola cast	55.00
Mixed yard cast	55.00

#### Hamilton, Ont.

No. 1 hvy. melting	\$52.00
No. 2 hvy. melting	47.00
No. 1 bundles	52.00
No. 2 bundles	40.50
Mixed steel scrap	46.00
Bushelings	39.50
Bush., new fact., prep'd	50.00
Bush., new fact., unprep'd	46.00
Machine shop turn	31.00
Short steel turn	35.00
Mixed bor, and turn	28.00
Rails, rerolling	60.00
Cast scrap	50.00







# of the business machine

Twenty-six centuries ago the Chinese used the abacus for adding and subtracting . . . Ancient Sumarians and Babylonians recorded many of their business transactions on clay tablets . . . The United States saw the development of the first commercial typewriter in 1873. The "Graphophone" dictating machine, first introduced in 1887, was an indirect descendant of a shorthand method of 5000 signs devised by Cicero's secretary.

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#### Suez Reverses Copper Trend

Outlook is for increased demand while production holds at present levels . . . Britain is not likely to release its surplus now . . . Automotive orders are heavier.

◆ THE TROUBLE at Suez is changing the tone of both U.S. and world copper markets. The new outlook: a definite reversal of the oversupply trend.

World copper production will hold very close to present levels, while demand is expected to pick up considerably.

A war traditionally lends strength to copper markets. Although little or no copper arrives at London markets through the Canal, the shooting will encourage more spot buying and considerably more day-to-day fluctuation. Britain will think twice before releasing the 36,000 tons of copper it had considered surplus. This would remove an element which has been a major factor in weakening the British market.

In addition to the influence of Suez, markets in this country are strengthening. The auto companies are beginning to place heavier orders in line with improved outlook for car sales. Other major customers who had been waiting for (1) the price reduction, and (2) Detroit to make the first move are beginning to come into the market. Defense copper requirements are also showing indications of added strength.

On the supply side of the ledger, two of the three major copper producers had indicated intention of cutting production. They're probably reconsidering the question this week.

INTERNATIONAL INVEST-MENTS... While the trouble at Suez directly affects only a few of the major metals in the U.S. markets, it does point up graphically the inherent dangers for U.S. metalworking at sources located outside of the U.S. Several recent reports from financial groups indicate that outlook in other parts of the world is mixed.

With shipments of tin from Malaya delayed and the market currently at astronomic levels, a closer look at more proximate sources is in order. The American firm of Ford, Bacon & Davis took a long, close look at the Bolivian tin industry, third largest in the world, and came up with a very discouraging report.

It was found that a lack of working capital and inefficiency in ore reserve preparation and management will cause increased work stoppages and higher costs.

Further, unless some radical steps are taken soon, profits will drop off 40 pct more within the next five years.

And to complete the picture F. B. & D. reports morale, discipline and respect for law and order is completely lacking among the workers.

Outlook for other metals from Bolivia is considerably more encouraging.

**Primary Prices** 

(cents per lb)	current price	last price	date of change
Aluminum inget	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (P)	38.00	40.00	10/26/56
Copper (CS)	36.00	35.00	10/31/58
Lead, E. St. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingst	36.00	34.50	8/13/56
Magnosium piy	35.25	33.75	8/13/86
Nickel	64.50	80.00	11/24/54
Silver	91.375	91.00	10/17/56
Titanium sponge	270-300	295-325	7/7/56
Zinc, E. St. L.	13.50	13.00	1/6/56
Zinc, N. Y.	14.00	13.50	1/6/56

ALUMINUM: 99% ingot frt allwd. COP-PER: (P) = producers, (CS) = custom smelters, electrolytic. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. SILVER: ingots, ¢ per troy oz. ZINC: prime western. TIN: see column at right, other primary prices, pg. 160.

A few internal adjustments will put the tungsten industry into a good competitive position, says Ford, Bacon & Davis. And the situation in antimony, lead, zinc, and copper is relatively bright.

More encouraging news from South America comes from Chile. The First National City Bank of New York reports that the raging inflation rampant in Chile, a major copper producer, is rapidly being brought under control Recommendations of the American firm of Klein & Saks have been adopted, including freezing wages and prices, restricting bank credit, and reorganizing the government budget. The crisis isn't over yet but the fluctuation in the value of the peso has eased, and the situation was considered hopeful enough to land Chile a \$75 million loan from the International Monetary Fund, U. S. commercial banks and U.S. Treasury.

MAGNESIUM . . . Total shipments of magnesium castings in August 1956 topped both the previous month and the corresponding month in 1955, according to the Magnesium Assn. The increase to 1525 tons in August from 1405 in July was due mainly to the boost in shipments of sand castings, 705 tons from 656 tons shipped in July, and the boost in permanent mold castings from 70 tons to 80 tons in August.

This is the second largest shipping month since January 1954, topped only by the April 1956 shipment of 1570 tons.

TIN . . . Now that it has been definitely established that all ships carrying tin have been rerouted, the tin price sagged off a bit from the panic price of \$1.14 to \$1.11. Actually there was very little trading because (1) potential buyers aren't exactly sure what will happen next, and (2) there still isn't much tin to be had.

Tin prices for the week: Oct. 31—112.50; Nov. 1—114.00; Nov. 2—111.00; Nov. 3—111.00; Nov. 5—111.25; Nov. 6—holiday.

#### Monthly Average Metal Prices

(Cents per lb except as noted)
Average prices of the major nonferrous
metals in October based on quotations appearing in THE IRON AGE, were as follows.

Electrolytic copper, del'd Conn Valley	-39.333
Straits Tin, New York	106.847
Zinc, E. St. Louis	13.50
Lead, St. Louis  Aluminum ingot, frt allw'd-	15.80 27.10

Note: Quotations are going prices.



#### **MILL PRODUCTS**

(Cents per lb, unless otherwise noted)

#### ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

#### Flot Sheet (Mill Finish) and Plate ("F" temper except 6061-0)

Alloy	.032	,081	.136-	.250- 8.
1800, 1100, 3003 5052 5061-0	44.3 51.8 48.9	42.1 46.8 44.6	40.9 45.1 42.8	40.2 42.9 42.6

#### **Extruded Solid Shapes**

	1	F	BA	et	0	1				_			6063 T-5	6062 T-6
6- 8.				*		*	9	*	*		*	*	45.5-47.3 46.2-47.7	
24-26. 86-38.													49.4-49.5	73.1-77.8

#### Screw Machine Stock-2011-T-3

Size"	36	3/4-3/6	%-1	11/4-11/4
Price	59.7	58.8	57.4	55.2

#### Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length*→	72	96	120	144		
019 gage	\$1.352	\$1.803	\$2.254	\$2.704		
024 gage	1.686	2.252	2.815	3.378		

#### MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed) Sheet and Plate

Type→ Gage	→ 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand, Grade	14499	67.9	69.0	77.9	103.1
AZ31B Spec.		93.3	95.7	108.7	171. 3
Tread Plate		70 6	71.7		
Tooling Plate	78.0				

#### **Extruded Shapes**

factor->	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	. 69.4	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

#### Alloy Ingot

#### NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

"A" Nickel	Monel	Inconel
Sheet, CR 113	97	118
Strip, CR 111	99	128
Rod, bar, HR 94	80	99
Angles, HR 94	80	99
Plates, HR 107	96	111
Seamless tube 144	120	190
Shot, blocks	78	***

#### COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.63		54.86	57.83
Brass, 70/30	49.44	49.98	49.37	52.35
Brass, Low	52.65	53.19	52.59	55.46
Brass, R L	53.79	54.33	53.73	56.60
Brass, Naval	53.39		47.70	56.55
Muntz Metal	51.44		47.25	
Comm. Bs.	55.48	56.02	55.42	58.04
Mang. Bs.	57.13		51.23	
Phos. Bz. 5%	76.25		76.75	

TITANIUM (10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$12.16-\$12.60: alloy, \$15.00-\$15.75: Plate, HR. commercially pure, \$10.00-\$15.50: alloy, \$11.50-\$12.00. When, rolled and/or drawn, commercially pure, \$9.00-\$11.50; alloy, \$11.50: Bar. HR or forged, commercially pure, \$7.55-\$7.80: alloy. \$7.55-\$7.75.

#### PRIMARY METAL

#### REMELTED METALS

#### **Brass Ingot**

(0	ents	pe	r	lb	6	le	1	ĝη	24	7	*6	d	l,	-	N	31	ri	lo	d	и	te	)
85-5-5	ingo	t																				
No.						0											0	0	۰			35.00
No.							ĸ.			٠									٠			33.75
No.						á	۵			۰				۵		٠	٥		۵	۵		32.25
80-10-																						
No.																						38.50
No.						*	*	*	*		×	*	×	×	×	×	×	*		4		36.75
88-10-																						
No.																						48.75
No.																						40.00
No.						×	8	5			*	*	*	*	•	*		*	٠	*	*	10.00
Yellow No.																						27.50
Manga				n#							*		*	*	۰	*	*	*		•		21.00
No.										6												30.75

#### Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

39-9 Himmin	im-sincon amoj	10
0.30 copper	max	26 25-27.25
0.60 copper	max	26.00-27.00
Piston alloys	(No. 122 typ	e) 26.00-27.00
No. 12 alum.	(No. 2 grade)	23.75-25.00
108 alloy		24.00-25.00
195 alloy		26.50-27.00
13 alloy (0.6	0 copper max.	)26.00-27.00
AXS-679		24.00-25.00

#### Steel deoxidizing aluminum, notch ber

	granul	at	ı.	•	m	3	h	0	ŧ	
Grade	1-95-9714	96								.24.00-25.00
Grade	2-92-95%									.23.25-25.00
Grade	3-90-92%									.22.50-23.50
	4-85-9006									.22.00-23.00

#### SCRAP METALS

		газ	3	m		acrab	
(Cer	ta per	900	214	nd	. 0	dd 1¢ pe	r lb for
ahi	nonent	8 0	1	20	.00	0 lb and	over)
0.000	pincone		,	-	,	Heavy	Turnings
Copper						32	311/4
Yellow						2456	22%
Red br						281/2	27 3/4
Comm.						29 1/4	28 34
Mang.						23 1/4	221/4
Wallam.	hanne				An.	0.4.9/	

#### **Customs Smelters Scrap**

(Cents per	pound to t				-	lots,	delivered
No. 1 coppe							30 14
No. 2 coppe	r wire	0 0		 			29
Light coppe	F	 0 0	0		0	0 +	2634
*Refinery b						× 8:	21.12

#### Ingot Makers Scrap

to refinery)	, denveres
Av. 1	2011
No. 1 copper wire	30 1/4
No. 2 copper wire	29
Light copper	2634
No. 1 composition	281/4
No. 1 comp. turnings	263
Hvy. yellow brass solids	1914
Brass pipe	1934
Radiators	21 34
Aluminum	
Mixed old cast	16 -1636

# Mixed old cast. 10 -10 32 Mixed new clips . 17 -17 32 Mixed turnings, dry . 16 -17 32 Clears' Scrap (Dealers' buying price, f.o.b. New York in cents per pound)

#### Copper and Brass

No. 1 copper wire	2714-28
No. 2 copper wire	26 -26 1/2
Light copper	2314-24
Auto radiators (unsweated).	17 1/2-18
No. 1 composition	231/4-24
No. 1 composition turnings	22 -221/2
Cocks and faucets	18 -181/2
Clean heavy yellow brass	15 -15 1/2
Brass pipe	19 -19 1/2
	201/2-21
No. 1 brass rod turnings	18 -181/2

#### Aluminum

Alum. pistons and struts	61/2-	- 7
Aluminum crankcases	111/2-	-12
1100 (2S) aluminum clippings	141/2-	-15
Old sheet and utensils	111/2-	-12
Borings and turnings	8 -	8 1/2
Industrial castings	111/2-	-12
2024 (24S) clippings	13 -	-13 1/2
Zinc		

## 

## Nickel and Monel

## Nickel and Monel Pure nickel clippings Clean nickel turnings Nickel anodes Nickel rod ends New Monel clippings Clean Monel turnings Old sheet Monel Nickel silver clippings, mixed Nickel silver turnings, mixed 80-90 70-80 70-80

#### Lead Miscellaneous

# 

Siphon tops	2.60
Small foundry type 1514-	15 1/2
Monotype 141/2-	15
Lino, and stereotype 13 -	134
Electrotype 121/2-	12%
Hand picked type shells 10 -	103
Lino. and stereo. dross 51/4-	5 %
Floring dross 414-	4 1/

	RICES		SLABS	OMS,	PIL- ING		HAPES	LS	STRIP							
Ne	(Effective ov. 6, 1956)	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled		
1	Bethlehem, Pa.		-	107.00 B3				5.05 B3								
-		\$74.00 B3.		107.00 B3,	S an #1			5.05 B3	4.875 B3, 6	.85 R7	6.95 B3					
_		R3		R3	0.50 (1)	3.65 27	.40 23	3.03 D)	R3	.83 K/	0.93 D3					
(	Clayment, Del.															
1	Harrison, N. J.													14.55 CII		
1	Conshohocken, Pa.		\$96.50 42	114.00 .42					4.725 A2 6	.90 /12	6.95 A2					
1	New Bodford, Mass.								7	.30 R6						
	Johnstown, Pa.	\$74.00 B3	\$91.50 B3	107.90 B3		5.05 B3	7.40 B3									
1	Boston, Mass.								7	.40 T8				14 90 T8		
	New Haven, Conn.	*							7	.30 DI						
1	Baltimore, Md.								- 4	i.85 T8						
1	Phoenixville, Pa.					5.85 P2		5.85 P2								
1	Sparrows Pt., Md.								4.675 B3		6.95 B3					
1	Bridgeport, Wallingford, Conn.	\$79.00 N8	\$96.50 N8	\$107.00 N8						7.30 W1						
-	Pawtucket, R. I. Worcester, Mass.	\$19.00 110	\$99.30 /\0	\$107.00 7/8	-					1.95 T8 7.48 A5,N7				14.90 N7		
_	Alten, III.								4.875 L1							
-	Ashland, Ky.								4.675 A7			-				
-	Canton-Massillon,		\$94.00 R3	\$107.00 R3,						6 85 C4		10.10 G4		14.55 G4		
-	Dover, Ohio Chicago, III. Franklin Park, III.	\$74.00 UI,	\$91.50 UI,	75 \$107.00 UI,	5.90 U1	5.00 UI,	7.35 UI. YI	5.00 UI		6.85 G4 6.95 A1, T8		10.10 G7	7.75 W8	14.55 AI,		
1.		R3	R3,W8	R3,W8		W8	6.00 W8		4.675 Al				S9	S9, T8		
	Cleveland, Ohio									6.85 A5,J3			7.75 J3			
-	Detroit, Mich.	\$74.00 R5		\$107.00 R5					4.775 G3, M2	6.95 M2,G3, D2,P11	7.05 G3	10.10 G3, S1,D2	7.05 G3			
	Anderson, Ind.									6.85 G#		10.10 G#				
	Duluth, Minn.															
WEST	Gary, Ind. Harber, Indiana	\$74.00 UI	\$91.50 UI	\$107.00 UI, YI	5.90 /3	5.00 UI	7.35 U1,13	5.00 13	4.675 UI, I3, YI	5.85 Y1	6.95 U1, 13, Y1	10.20 Y/	7.75 UI, YI			
EW	Sterling, III.	\$74.00 N4							4.775 N4		-	-		-		
MIDDLE	Indianapelia, Ind.	-								7.90 C5	-			-		
N	Newport, Ky.	-			-			-		1.30 C	-	-	7.75 N5	-		
	Middletown, Ohio				-						-		1.12.112	-		
	Niles, Warren, Ohio Sharon, Pa.		\$91.50 SI, C10	\$107.00 SI				-	4.675 S1,	6.85 T4	6.95 SI, R3	10.00 SI, R3	7.75 SI	14.55 S		
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$74.00 UI, J3	\$91.50 UI, J3,CII	\$107.00 UI	5.90 UI	5.00 UI, J3	7.35 UI, J3	5.00 UI	4.675 P6	5.750 P6 6.85 J3,B4 S7			7.75 S9	14.55 S		
	Portsmouth, Ohio			-	-			-								
	Weirton, Wheeling, Follansbee, W. Va.					5.00 W3			4.675 W3	6.85 W3,F	3 6.95 W.	9.45 W3				
	Youngstown, Ohio	\$74.00 R3	\$91.50 YI, C10	\$107.00 }	71	5.00 Y/	7.35 Y/		4.675 UI, YI	6.85 Y1,C	6.95 UI	, 10.20 Y/	7.75 UI. YI			
	Fontane, Cal.	\$83.50 K1	\$101.00 K/	\$128.00 K	7	5.70 KI	8.05 K/	5.85 K1	5.475 K1	8.50 K1						
	Geneva, Utah	\$91.50 C7				5.00 C7	7.35 C7									
	Kansas City, Mo.					5.10 S2	7.45 S2		4.925 S2		7.20 S2		-			
-	Les Angeles, Terrance, Cal.		\$101.00 B	2 \$127.00 2	32	5.70 C7, B2	8.05 B2		5.425 B2, C7	8.80 C1			8.95 B2			
WEST	Minnequa, Colo.					5.30 C6			5.775 C6							
1	Portland, Ore.					5.75 02										
	San Francisco, Nile Pittsburg, Cal.	8,	\$101.00 E	32		5.65 B2	8.00 B2		5.425 C7,B	2						
	Seattle, Wash.		\$105.00 E	12		5.75 B2	8.10 B2		5.675 B2							
-	Atlanta, Ga.								4.875 A8							
SOUTH		\$74.00 T				5.00 T2, F 5.30 C/6	7.35 T2		4.675 T2, R 4.975 C10	13	6.95 T	2				
1 3	Houston, Lone Sta	, \$80.00 L	3 \$96.50 S2	\$112.00 .	52	5.10 S2	7.45 S2		4.925 S2		7.20 S	2		-		

	RICES				S	HEETS					WIRE ROD	TINP	LATE†	BLACE	
N	(Effective Nov. 6, 1956)	Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized	Enamel- ing	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb, base bex	Electro* 0.25-lb. base box	Holloward Enameling 29 ga.	
	Bethlehem, Pa.														
1	Buffalo, N. Y.	4.675 B3	5.75 B3				6.90 B3	8.525 B3			5.80 W6	† Special co	† Special conted mfg.		
-												terne deduct 1.25-lb, coke	base box		
	Claymond, Del.					-						blackplate S	naking quality 5 to 128 lb. from 1.25-lb.		
-	Conshobecken, Pa.	4.725 A2	5.80 /12	-			6.95 A2		7			coke base be * COKES:	IK.	-	
	Harrisburg, Pa.	4.100 /12	3.00 712				0.20 /15					add 25ć. ELECTRO	0.50-lb. add		
_	Hartford, Conn.			-		-						25¢; 0.75-lb. 1.00-lb. add	add 65¢; \$1.00. Differ-	-	
EAST	Johnstown, Pa.										5.80 B3	ential 1.00 ll add 65¢.	s./0.25 lb.	-	
	Fairless, Pa.	4.725 UI	5.80 UI	-			6.95 UI	8.575 UI				\$9.80 UI	\$8.50 UI		
	New Haven, Conn.														
	DI : : 10 D												-	-	
	Phoenixville, Pa.	4 675 D2	e 70 D2	6 20 D2			5 00 D2	8.575 B3	9.275 B3		5.90 B3	49 60 D2		-	
	Sparrows Pt., Md. Worcester, Mass.	4.675 B3	5.75 B3	6.30 B3			6.90 B3	0.013 D)	9.613 0)		6.10 A5	\$9.80 B3			
	Workester, Mass.														
	Trenton, N. J.														
	Alton, III.										6.00 L1				
	Ashland, Ky.	4.675 A7		6.30 A7	6.325 47										
	Canton-Massillon, Dover, Ohio			6.30 R3,R1											
	Chicago, Joliet, III.	4.675 W8,					6.90 UI			5.80 K2	S.80 A5, R3, N4, W8, K2				
	Sterling, Ill.	Al		-				-			5.90 N4, K2		-	-	
	Cleveland, Ohio	4.675 /3,	5.75 /3,		6.325 R3		6.90 R3	8.525 R3,			5.80 //5			-	
	Citytelena, Onio	R3	R3		0.000			13							
	Detreit, Mich.	4.775 G3, M2	5.85 G3 5.75 M2				7.00 G2	8.625 G3							
	Newport, Ky.	4.675 A9	5.75 A9												
WEST	Gary, Ind. Harbor, Indiana	4.675 UI, 13, YI	5.75 UI, I3, YI	6.30 UI, I3	6.325 UI, 13, YI	6.70 UI	6.90 U1, Y1,13	8.525 UI, YI			5.80 Y/	\$9.70 UI, YI	\$8.40 <i>I</i> 3, <i>UI</i> , <i>YI</i>	7.15 UI, YI	
MIDDLE	Granite City, III.	4.875 G2	5.95 G2	6.50 G2	6.525 G2								\$8.50 G2	7.25 G2	
MID	Kokomo, Ind.			6.40 C9							5.90 C9				
-	Mansfield, Ohio		5.75 E2			6.70 E2									
	Middletown, Ohio		5.75 A7	6.30 A7	6.325 A7	6.70 A7									
	Niles, Warren, Ohie Sharen, Pa.	4.675 SI, R3,N3	5.75 R3	6.30 R3	6.325 N3	6.70 N3	6.90 SI, R3	8.525 S1, R3					\$8.30 R3		
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 UI. J3,P6	5.75 U1, J3,P6	6.30 UI, J3	6.325 UI		6.90 UI. J3,R3	8.525 U1. J3	9.275 UI		5.80 A5, P6,J3	\$9.70 J3, UI	\$8.40 UI	7.15 <i>UI</i>	
	Portsmouth, Ohio	4.675 P7	5.75 P7					-			5.80 P7				
	Weirton, Wheeling,	4.675 W3,	5.75 W3,	6.30 W3,		6.70 W3,	6.90 W3	8.525 W3				\$9.66 W5	\$8.30 W5	7.15 W5 7.40 W3	
	Follansbee, W. Va.	W5 4.675 U1,	W5,F3	W5	6.325 Y1	W5	6.90 Y/	8.525 Y/			5.80 Y/		-	7.15 Y/	
_		YI			V.00.0 11										
	Fentana, Cal.	5.475 K/	6.95 K1		-		7.70 K1	9.725 KI				\$10.35 K1	\$9.05.K1		
	Geneva, Utah	4.775 C7	-			-					6 OF C1			-	
	Kansas City, Mo.	-		-					-		6.05 S2 6.60 B2				
WEST	Les Angeles, Terrance, Cal.										EAU DI				
*	Minnequa, Colo.										6.05 C6				
	San Francisco, Niles, Pittsburg, Cal.	5.375 C7	6.70 C7	7.05 C7							6.45 C7	\$10.45 C7	\$9.15 C7		
	Seattle, Wash.				-										
_	Atlanta, Ga.			-							-		-		
SOUTH	Fairfield, Ala.	4.675 T2,	5.75 T2,	6.30 T2,			-				5.80 T2,R3	\$9.80 T2	\$8.50 72		
in.	Alabama City, Ala.	R3		R3											

	STEEL		- January	p. Passas meter				l same per	,	nerwise noted.	apply.	1
	PRICES			ВА	RS				PL	ATES		WIRE
1	(Effective Nov. 6, 1956)	Carbon† Steel	Reinforc-	Cold Finished	Alloy Hot- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
	Bethlehem				6.125 B3	8.325 B3	7.40 B3					
	Buffalo, N. Y.	5.075 B3,R3	5.075 B3,R3	6.90 B5	6.125 B3,R3	8.325 B5,B3	7.40 B3	4.85 B3				7.20 H/6
	Clayment, Del.	,						5.35 C4		6.85 C4	7.55 C4	
	Caatesville, Pa.							5.25 L4		6.85 L4	7.55 L4	
	Canshohocken, Pa.							4.90 /12	5.925 A2	6.25 A2	7.25 A2	
	Harrisburg, Pa.							5.80 P2	6.275 C3			
	Hartford, Conn.			7.35 R3		8.625 R3	7.40 B3					
EAST	Johnstown, Pa.	5.075 B3	5.075 B3		6.125 B3			4.85 B3		6 .85 B3	7.25 B3	7.20 B3
EA	Fairless, Pa.	5.225 UI	5.225 UI		6.275 UI							
	Newark, N. J.			7.30 W10		8.50 W10						
	Camden, N. J.			7.30 P10		8.50 P10						
	Bridgeport, Conn. Putnam, Conn.	5.30 N8	5.30 N8	7.20 N8 7.40 W10	6.20 N8	8.475 N8	7.50 N8					
	Sparrows Pt., Md.		5.075 B3					4.85 B3		6.85 B3	6.85 B3	7.30 B3
	Palmer, Worcester, Readville, Mass.	5.225 M7	5.225 M7	7.40 B5,C14		8.325 A5						7.50 A5,W
	Milton, Pa.					8.625 B5						9.025 T8
	Spring City, Pa.			7.38 K4		8.50 K4						
	Alten, III.	5.275 L1										7.40 L1
	Ashland, Newport, Ky.							4.85 A7,N5		6.85 N5		
	Canton, Massillon, Ohio			6.85 R3,R2	6.125 R3,T5	8.325 R3,R2, T5						
	Chicago, Joliet, Ill.	5.075 U1,R3, W8,N4 5.575 P13	5.075 U1,R3, N4 5.575 P13	6.85 A5,B5, W10,L2 W8,L2,N9	6.125 UI,R3, W8	8.325 A5,B5, W8,L2,N9, W10	5.875 W8	4.85 U1,13, W8,A1	5.925 UI	6.85 U1,W8	7.25 UI	7.20 A5, I R3,N4, II
	Cleveland, Ohio	5.075 R3	5.075 R3	6.85 A5,C13		8.325 A5,C13	7.425 R3	4.95 J3,R3	5.925 J3		7.25 J3,R3	7.20 A5, C13
	Detroit, Mich.	5.175 G3	5.425 G3	7.05 <i>B5</i> , <i>P8</i> 7.10 <i>P3</i> 6.85 <i>R5</i>	6.225 G3 6.125 R5	8.525 <i>B5</i> , <i>P3</i> , <i>P8</i> 8.325 <i>R5</i>	7.525 G3	4.95 G3		6.90 G3		
WEST	Duluth, Minn.											7 20 A5
LE W	Gary, Ind. Harbor, Crawfordsville	5.075 U1,13, Y1	5.075 U1,13, Y1	6.85 R3,M5	6.125 UI,I3, YI	8.325 R3,M4	7.425 U1,13, Y1	4.85 U1,13, Y1	5.925 /3	6.85 UI, YI	7.25 UI, YI	7.30 M4
MIDDLE	Granite City, III.							5.05 G2				
Z	Kakoma, Ind.											7.36 C9
	Sterling, III.	5.525 N4	5.175 N4									7.30 K2
	Niles, Warren, Ohio Sharon, Pa.			6.85 C10	6.125 C10,S1	8.325 C10	7.425 SI	4.85 S1,R3		6.85 <i>S1</i>	7.25 SI,R3	
	Pittsburgh, Pa. Midland, Pa.	5.075 UI, CII,J3	5.075 U1,J3	6.85 A5,C8, J3, R3, S9, B4,W10	6.125 U1,C11	8.325 A5,R3, S9,C8,W10, C11	7.425 U1,J3	4.85 U1,J3	5.925 UI	6.85 U1, J3	7.25 U1,J3	7.20 A5, J P6
	Portsmouth, Ohio											7.20 P7
	Weirton, Wheeling,							4.85 W5				
	Fellansbee, W. Va.  Youngstown, Ohio	5.075 U1, Y1,R3	5.075 UI, YI,R3	6.85 U1, Y1, F2	6.125 UI, YI	8.325 Y1,F2	7.425 U1, Y1	4.85 U1, Y1, R3	-	6.85 YI	7.25 Y/	7.20 Y1
-	Emeryville, Cal.	5.825 /5	5.825 /5					10				
	Fontana, Cal.	5.775 K1	5.775 K1		7.175 K/	-	8.125 K/	5.55 K1	-	7.55 KI	7.95 K1	
	Geneva, Utah	5.175 C7			1.11311/		D.160 R.1	4.85 C7	-	1.33 K/	7.25 C7	
	Kansas City, Mo.	5.325 S2	5.325 S2		6.375 S2		7.675 S2	4.03 €/		-	1.60 €/	7.45 S2
ST		5.775 C7,B2	5.775 C7,B2	8.30 R3	7.175 B2		8.125 B2		-			8.15 B2
WEST	Los Angeles, Torrance, Cal.	3,110 67,25	5.710 67,008	2.00 10	1.110 102		6.140 DZ					0.10 00
	Minnequa, Colo.	5.525 C6	5.525 C6					5.70 C6				7.45 C6
	Portland, Ore.	5.825 02	5.825 02									
	San Francisco, Nilos, Pittsburgh, Cal.	5.775 C7,P9 5.825 B2	5.775 C7,P9 5.825 B2				8.175 B2					8.15 C7,C
	Seattle, Wash.	5.825 B2 5.825 N6	5.825 B2				8.175 B2	5.75 B2		7.75 B2	8.15 B2	
-	Atlanta, Ga.	5.575 A8										7.40 A8
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	5.075 T2,R3 5.375 C/6	5.075 T2,R3 5.375 C/6				7.425 T2	4.85 T2,R3			7.25 T2	7.20 72,1
36	Houston, Ft. Worth,	5.325 S2	5.325 S2		6.375 S2		7.675 S2	4.95 S2		6.95 S2	7.35 S2	7.45 S2

#### Steel Prices (Effective Nov. 6, 1956)

#### Key to Steel Producers

With Principal Offices

- Al Acme Steel Co., Chicago
- A2 Alan Wood Steel Co., Conshohocken, Pa.
- Allegheny Ludlum Steel Corp., Pittsburgh
- American Cladmetals Co., Carnegie, Pa. 44
- A5 American Steel & Wire Div., Cleveland
- A6 Angell Nail & Chaplet Co., Cleveland
- Armco Steel Corp., Middletown, Ohio
- Atlantic Steel Co., Atlanta, Ga. AR.
- Acme-Newport Steel Co., Newport, Ky. 49
- B1 Bahcock & Wilcox Tube Div., Beaver Falls, Pa.
- #17 Bethlehem Pacific Coast Steel Corp., San Francisco
- B3 Bethlehem Steel Co., Bethlehem, Pa.
- Blair Strip Steel Co., New Castle, Pa. Bis
- Bliss & Laughlin, Inc., Harvey, Ill.
- Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa. B6
- Calstrip Steel Corp., Los Angeles
- Carpenter Steel Co., Reading, Pa.
- Ci Central Iron & Steel Co., Harrisburg, Pa. CI
- Claymont Products Dept., Claymont, Del.
- Cold Metals Products Co., Youngstown, O. CS
- Colorado Fuel & Iron Corp., Denver
- C7 Columbia Geneva Steel Div., San Francisco
- C8 Columbia Steel & Shafting Co., Pittsburgh
- £39 Continental Steel Corp., Kokomo, Ind.
- Copperweld Steel Co., Pittsburgh, Pa. C10
- CII Crucible Steel Co. of America, Pittsburgh
- C12 Cumberland Steel Co., Cumberland, Md.
- C13 Cuyahoga Steel & Wire Co., Cleveland
- C14 Compressed Steel Shafting Co., Readville, Mass.
- C15 G. O. Carlson, Inc., Thorndale, Pa. C16 Connors Steel Div., Birmingham
- C17 Chester Blast Furnace, Inc., Chester, Pa.
- DI Detroit Steel Corp., Detroit
- D2 Detroit Tube & Steel Div., Detroit
- D3 Driver Harris Co., Harrison, N. J.
- Dickson Weatherproof Nail Co., Evanston, Ill. D4
- D5 Henry Disston Div., Philadelphia
- EI Eastern Stainless Steel Corp., Baltimore
- E2 Empire Steel Co., Mansfield, O.
- F1 Firth Sterling, Inc., McKeesport, Pa.
- F2 Fitzsimons Steel Corp., Youngstown

- F3 Follansbee Steel Corp., Follansbee, W. Va.
- G2 Granite City Steel Co., Granite City, Ill.
- G3 Great Lakes Steel Corp., Detroit
- G4 Greer Steel Co., Dover, O.
- HI Hanna Furnace Corp., Detroit
- 12 Ingersoll Steel Div., Chicago
- 13 Inland Steel Co., Chicago
- 14 Interlake Iron Corp., Cleveland
- J1 Jackson Iron & Steel Co., Jackson, O.J2 Jessop Steel Corp., Washington, Pa.
- 13 Jones & Laughlin Steel Corp., Pittsburgh
- J4 Joslyn Mfg. & Supply Co., Chicago
- 15 Judson Steel Corp., Emeryville, Calif.
- KI Kaiser Steel Corp., Fontana, Cal.
- K2 Keystone Steel & Wire Co., Peoria
- K3 Koppers Co., Granite City, Ill. K4 Keystone Drawn Steel Co., Spring City, Pa.
- LI Laclede Steel Co., St. Louis
- L2 La Salle Steel Co., Chicago
- L3 Lone Star Steel Co., Dallas
- L4 ' Lukens Steel Co., Coatesville, Pa.
- MI Mahoning Valley Steel Co., Niles, O.
- M2 McLouth Steel Corp., Detroit
- M3 Mercer Tube & Mfg. Co., Sharon, Pa.
- M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
- M5 Monarch Steel Div., Hammond, Ind.
- M6 Mystic Iron Works, Everett, Mass.
- M7 Milton Steel Products Div., Milton, Pa.
- N1 National Supply Co., Pittsburgh
- N2 National Tube Div., Pittsburgh
- N3 Niles Rolling Mill Div., Niles, O.
- N4 Northwestern Steel & Wire Co., Sterling, Ill.
- N6 Northwest Steel Rolling Mills, Seattle
- N7 Newman Crosby Steel Co., Pawtucket, R. I.
- Northeastern Steel Corp., Bridgeport, Conn.
- N9 Nelson Steel & Wire Co.
- 01 Oliver Iron & Steel Co., Pittsburgh
- 02 Oregon Steel Mills, Portland
- PI Page Steel & Wire Div., Monessen, Pa.
- P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
- P3 Pilgrim Drawn Steel Div., Plymouth, Mich. P4 Pittsburgh Coke & Chemical Co., Pittsburgh
- P5 Pittsburgh Screw & Bolt Co., Pittsburgh
- P6 Pittsburgh Steel Co., Pittsburgh P7 Portsmouth Div., Detroit Steel Corp., Detroit
- P8 Plymouth Steel Co., Detroit

- P9 Pacific States Steel Co., Niles, Cal. P10 Precision Drawn Steel Co., Camden, N. J.
- P11 Production Steel Strip Corp., Detroit
- P13 Phoenix Mfg. Co., Joliet, Ill.
- P14 Pacific Tube Co.
- RI Reeves Steel & Mfg. Co., Dover, O.
- R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
- RI Republic Steel Corp., Cleveland
- RI Roebling Sons Co., John A., Trenton, N. J.
- R5 Rotary Electric Steel Co., Detroit
- R6 Rodney Metals, Inc., New Bedford, Mass. RJ Rome Strip Steel Co., Rome, N. Y.
- SI Dearborn Div., Sharon Steel Corp., Sharon, Pa.
- S2 Sheffield Steel Div., Kansas City
- S3 Shenango Furnace Co., Pittsburgh
- S4 Simonds Saw and Steel Co., Fitchburg, Mass.
- S5 Sweet's Steel Co., Williamsport, Pa. 56 Standard Forging Corp., Chicago
- S7 Stanley Works, New Britain, Conn.
- S8 Superior Drawn Steel Co., Monaca, Pa.
- 59 Superior Steel Corp., Carnegie, Pa.
- S10 Seneca Steel Service, Buffalo
- 71 Tonawanda Iron Div., N. Tonawanda, N. Y.
- T2 Tennessee Coal & Iron Div., Fairfield
  T3 Tennessee Products & Chem. Corp., Nashville
- 74 Thomas Strip Div., Warren, O.
- 75 Timken Steel & Tube Div., Canton, O.
- 77 Texas Steel Co., Fort Worth
- 78 Thompson Wire Co., Boston
- Ul United States Steel Corp., Pittsburgh
- U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
- U3 Ulbrich Stainless Steels, Wallingford, Conn.
- U4 U. S. Pipe & Foundry Co., Birmingham
- W1 Wallingford Steel Co., Wallingford, Co. W7 Washington Steel Corp., Washington, Pa.
- WJ Weirton Steel Co., Weirton, W. Va.
- W Wheatland Tube Co., Wheatland, Pa.

  W Wheeling Steel Corp., Wheeling, W. Va.
- W6 Wickwire Spencer Steel Div., Buffalo
- W7 Wilson Steel & Wire Co., Chicago
- IVI Wisconsin Steel Div., S. Chicago, Ill.
- W9 Woodward Iron Co., Woodward, Ala. W10 Wyckoff Steel Co., Pittsburgh
- W12 Wallace Barnes Steel Div., Bristol, Conn. YI Youngstown Sheet & Tube Co., Youngstown, O.

#### PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about \$200 per net ten.

							BUTTY	WELD										SEAM	LESS			
	1/2 1	ln.	3/4	In.	11	n.	11/4	In.	11/2	in.	2 1	n.	21/2-3	In.	2	In.	21	½ In.	3 1	ln.	31/2-	4 In.
STANDARD T. & C.	Blk.	Gal.	Bik.	Gal.	Bik.	Gal.	Blk.	Gal.	III.	Gal.	Blk.	Gal.	Bik.	Gal	Blk.	Gal.	Bik.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C. Sparrews Pt. B3. Youngstown R3. Footana K1. Fittsburgh J3. Alten, Ill. L1. Sharon M3. Fairless N2. Pittsburgh N1. Wheeling W5. Wheeling W5. Lord N2. Lord N4. Vanugstown V1. Lordin N2. Lord N4. Lord N4. Lord N4. Lord N4. Lord N4. Lord N4. Lord N5. Lord N5. Lord N6.	0.00 12.50 10.50 12.50 10.50 12.50 12.50 12.50 12.50 11.50	+4.75 +2.75 +15.25 +2.75 +2.75 +2.75 +2.75 +2.75 +2.75 +2.75 +2.75 +2.75 +2.75 +2.75 +2.75	15.50 3.00 15.50 13.50 15.50 15.50 15.50 15.50 15.50 15.50	+ 11.25 +0.75 1.25 +0.75 1.25 1.25 1.25 1.25 1.25	18.00 16.00 18.00 16.00 18.00 18.00 18.00 18.00	2.75 4.75 +7.75 4.75 2.75 4.75 2.75 4.75 4.75 4.75 4.75 4.75 4.75	20.50 18.50 20.50 20.50 20.50 20.50 19.50		21.00 21.00 20.00		21.50 19.50 21.50 21.50 21.50 21.50 20.50	5.00 7.00 +5.50 7.00 5.00 7.00 7.00 7.00 7.00 7.00	23.00 23.00 23.00 22.00	4.75 6.75 4.75 6.75 6.75 6.75 6.75	+2.00	+17	4.50 4.50	+12.25 +12.25 +12.25 +12.25	7.00	+9.75	8.50 8.50	
EXTRA STRONG PLAIN ENDS Sparrows Pt. B3 eungstown R3 airless N2 evotana K1 iritsburgh J3 Nleon, III. L1 Sharoo M3 Pittsburgh M1 Wheeling W5 Wheeling W5 Wheeling W7 Indiana Harber V1 Loranin N2 Loran	15.00 17.00 15.00 4.50 17.00 17.00 17.00 17.00 17.00 17.00 17.00	1.25 3.25 3.25 3.25 3.25 3.25 2.25	21.00 19.00 8.50 21.00 21.00 21.00 21.00 21.00 21.00 21.00	7.25 5.25 7.25 5.25 7.25 7.25 7.25 7.25	23.00 21.00 10.50 23.00 23.00 23.00 23.00 23.00 23.00 23.00	10.75 8.75 10.75 8.75 10.75 10.75 10.75 10.75 10.75	23.50 21.50 11.00 23.50 21.50 23.50 23.50 23.50 23.50 23.50	9.75 7.50 9.75 7.50 9.75 9.75 9.75 9.75 9.75	24.00 22.00 11.50 24.00 22.00 24.00 24.00 24.00 24.00 24.00 24.00	10.50 8.50 10.50 8.50 10.50 10.50 10.50 10.50 10.50	24.50 22.50 12.00 24.50 22.54 24.50 24.50 24.50 24.50 24.50 24.50	9.00 9.00 11.00 11.00 11.00 11.00 11.00	25.00 23.00 12.50 25.00 25.00 25.00 25.00 25.00 25.00 22.00	9.75 7.75 9.75 8.75 8.75 8.75 8.75	+0.5 +0.5 +0.5	+14.56 +14.56	7.0	0 +8.75 0 +8.75 0 +8.75 0 +8.75	9.56 9.56 9.56	+6.25 +6.25 +6.25	14.50 14.50	) +1.3 ) +1.3 ) +1.3

Threads only, buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on ninc price range of ever 9¢ to 11¢ per lb. East St. Leuis. Fer each 2¢ change in sinc, discounts vary as fellows: ½, ¾ and 1-in., 2 pt.; 1½, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., sinc price range of ever 13¢ to 15¢ would lower discounts on 2½° and 3° pipe by 2 points; sinc price in range over 7¢ to 9¢ would increase discounts. East St. Leuis sinc price now 13.50¢ per lb.

#### TOOL STEEL

F.o.b	. mill					
W	Cr	V	Mo	Co	per lb	SAE
18	4	1	-	-	\$1.68	T-1
18	4	1	_	5	2.385	T-4
18	4	2	-	-	1.845	T-2
1.5	4	1.5	8	_	1.04	M-1
6	4	3	6	-	1.43	M-3
6	4	2	5	-	1.185	M-2
High	-carb	on chi	romiu	m	.83 D	-3. D-5
OIL	harde	ned m	angai	0.000	.45	0-2
Spec	ial ca	rbon .			.41	W-1
Extr	a car	bon .			.345	W-1
		arbon				W-1
W	areho	use pr	rices	on an	d east o	f Mis-
					gher. W	est of
Miss	issipp	1, 6¢ 1	igher			

CLAD STEEL Base prices, cents per lb f.a.b

		Plate	(A3, J2	?, L4)	Sheet (12)
	Cladding	10 pct	15 pet	20 pet	20 pet
	362			.,	33.25
	304	34.60	38.00	41.50	35.25
1	316	39.70	43.20	46.65	52.25
929	321	36,35	39.80	43.50	42.00
Stainles	347	39.50	43.95	48.45	51.00
מש	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

#### **ELECTRICAL SHEETS**

22-Gage	Hot-Rolled	Cold-Reduced (Coiled or Cut Longth)			
F.o.b. Mill Cents Per Lb	(Cut Lengths)*	Semi- Processed	Fully Processed		
Field	9.00	9.20			
Armeture	10.35	10.35	10.85		
Elect	11.00	11.025	11.525		
Meter		12.075	12.575		
Dynamo	13.05	13.65	13.55		
Trans. 72	14.05	14.05	14.55		
Trans. 65	14.60	Grain (	Driented		
Trans. 58	15.10	Trans. 80	18,54		
Trans. 52	16.15	Trans. 73.	19.08		

Producing points: Beech Bottom (W5); Brackenridge (A5); Granite City (G2); Indiana Harber (L5); Manasheld (E2); Newport, Ky. (N5); Niles, O. (N5); Vandergrift (UI); Warren, O. (R3) (20¢ higher, HR); Zanesville, Buller (AI).

#### LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

		Gross Ton
Openhearth lump		 \$12.10
Old range, bessemer .		 11.25
Old range, nonbesseme	er	 11.10
Mesabi, bessemer		 11.00
Mesabi, nonbessemer		 10.85
High phosphorus		 10.85

#### WARE-Metropolitan Price, dellars per 100 lb. HOUSES Sheets Stria Plates Shape Rara Alley Bars Hot-Rolled 18 gs. & bvr. Cold-Relled (15 gage) Cald-Rolled Galvanicsed (10 gage) Cold-Dra Cities 8.97 9.27 9.83 8.16 8.49 8.44 8.30 10.14 Baltimera.....\$.16 8.99 9.12 8.27 8.12 8.57 8.34 9.09 9.73-9.83 9.05 8.90-9.00 8.40 15.05 14.45 18.51 18,10 8.98 8.80 7.90 8.89 10.81 10.87 15.00 14.45 18,40 Chicago ...... . 15 7.78-7.93 8.21 8.05-8.20 8.70 7.70-7.91 9.70 14.65 14.10 18.05 17.75 8.06 8.34 Cincinnati.......15 9.90 14.93 14.38 18.33 18.03 Cleveland ..... . 15 7.68 8.88 9.60 7.88 8.21 8.60 17.83 8.38 14.18 18.13 12.41 9.70 9.80 9.75 9.60 10.54 19.79 8.06 9.28 10.17 8.25 8.48 8,70 8.33 8.83 17.69 14.64 Heusten..... 8.70 9.45 8.60 8.90 8.95 10.55 15,50 19.30 19.65 Kansas City .... . 20 8.52 9.72 10.07 8.83 8.87 8.73 9.42 15.32 14.77 18.72 18.42 Los Angeles.... , 10 8.90 10.65 9.35 8.80 11.70 15.85 19.45 Memphis......15 9.85 9.82 8.03 8.57 14.77 18.17 17.87 New York . . . . . 10 9.63 8.91 8.88 8.84 8.93 10.71 15.02 14.47 18.42 18.12 8.00 8.40 8.35 8.78 8.45 10.70 9.66-10.22 10.05 Philadelphia..... 10 9.08-9.18 8.88 14.80 18.20 17.90 Pittsburgh......15 14.65 18.05 14.10 17.75 9.65 9.05 8.70 8.95 13.55 16.70 20.40 San Francisco . . 10 8.75 10.30 10.80 8.95 8.85 8.85 8.80 12.30 15.85 15.35 19.70 19.45 Seattle..... 9.35 11.20 11.55 9.50 9.05 9.15 9.30 13, 15 16.10 15.55 19.50 19,28 St. Lauis . . . . . 15 8.02-St. Paul . . . . . 15 8.29 9.21-9.49† 10.18 9.64 10.31 8.25-8.40 8.52 8.93-9.68 9.21 14.28

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

\*\*F.O.B. Plant, warehouse price. † 16 gage. ‡ Deduct for country delivery.

#### MERCHANT WIRE PRODUCTS

	Standard Q Ceated Nails	Weven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann?d	Merch. Wire Galv.
F.a.h. Mill	Cel	Cel	Cul	Cel	Col	∉/1b.	¢/lb.
Alabama City R3. Aliquippa, Pa. J3*** Aliquippa, Pa. J3*** Atlanta A8** Bartenville K2** Bartenville K2** Burfale M6. Chicage, Ill. N4** Cleveland A6. Cleveland A6. Cleveland A5. Crawfordaville M4** Denora, Pa. A5. Denoration D4. Houston S2. Johnstewn, Pa. B3** Jeliet, Ill. A5. Kekome, Ind. C9** Las Angeles B2** Kansas City S2* Minnequa C6† Menessen P6. Pittsburg, Cal. C7.	164 166 166 164 173 166 164 164 169 169 164 166 169 169 169 169 169 169 169 169 169	181 179 182 182 188 186 176 176 181 180 176 178 181 181 181	167	195 192 192 190 190 190 190 195 196 195	187 181 190 188 190 184 184 184 188 188 188 189 191 204	8.10 7.95 8.05 8.05 8.10 7.95 8.05 7.95 7.95 7.95 7.95 8.20 7.95 8.05 8.20 8.20 8.20 8.20 8.20 8.20 8.20 8.20	8.50 8.475 8.65 8.50 8.55 8.35 8.35 8.35 8.35 8.35 8.35 8.35
Portamenth P7. Rankin, Pa. A5. So. Chicago R3. S. San Francisco C6. Sparrows Pt. B3** Struthers, O. Y1* Worcester A5. Williamsport, Pa. S5.	164 167 166	176	175	214	184 187 190	7.95 8.10 8.90 8.05 7.95 8.25	8.35 8.50 9.30 8.65 8.45 8.65

• Zinc less than .10¢. † Plus zinc extras. •• 13.5 zinc. † Wholesalers only.

\*\*\* .10¢ zinc.

## C-R SPRING STEEL

		CARB	ON CO	NTEN	T
Cents Per Lb F.o.b. Mill			0.61- 0.80	0.81- 1.05	1.06-
Baltimore, Md. 78		10.10		15.30	18.25
Bristol, Conn. W12			12.90	15.30	18.25
Besten T8	. 8.50	10.10	12.90	15.30	18.25
Buffalo, N. Y. R7	. 7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. S9	. 1	9.86	12.60	15.00	
Cleveland A5			12.60	15.00	17.95
Detroit D1	. 8.05		12.70	15.10	
Detroit D2	. 8.05		12.70		
Dever, O. G4	. 7.95		12.60	15.00	17.9
Franklin Park, Ill. 78.	. 8.05		12.60		17.9
Harrison, N. J. Cll			12.90		18.2
Indianapolis C5	8.10	9.95	12.60	15.00	17.9
New Castle, Pa. B4	. 7.95	9.80	12.60	15.00	
New Haven, Conn. DI.			12.90	15.30	
Pawtucket, R. I. N7			12.90	15.30	18.2
Pittsburgh S7			12.60	15.00	17.9
Riverdale, Ill. Al			12.60		17.9
Sharon, Pa. Sl			12.60		17.9
Trenten R4		10.10	12.90	15.30	
Wallingford W1	. 8.44	10.10	12.90		18.1
Warren, Ohio T4			12.60		17.9
Weirton, W. Va. W3			12.60		17.9
Warcester, Mass. A5			12.90		
Youngstown C5	7.9	9.80	12.60	15.00	17.9

‡ On Application.

#### BOILER TUBES

\$ per 100 ft. carlead	Si	20	Seas	dess	Elec. Weld		
lets, cut 10 to 24 ft. F.e.b. Mill	OD- In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D	
Babesek & Wilcox	2	13			33.21		
	21/2	12			44.73		
	3	12			51.66		
	31/2	11			60.30		
	4	10	84.09	98.47	80.07		
National Tube	2	13	34.88	40.85	33,21		
	21/2	12			33.73		
	3	12	54.24	63.53	51.66		
	31/4	11	63.32	74.16	60.30		
	4	10	84.09	98.47	80.07		
Pittsburgh Steel	2	- 13	34.88	40.85			
	21/4	12		55.01			
	21/2	12		63.53			
	31/2	11		74.16			
	4	10		98.47			

#### RAILS, TRACK SUPPLIES

F.e.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Belts Untreated
Bessemer UI	5.075	6.00	6.35				
Sa Chicago P3				2 775			
Engley T2	5.075	6.08					
Pairheld / Z		0.00		8.175		9.023	
Gary Ul	5.075	6.00				6.025	
Ind. Harbor 13.	5.075		6.35	8.775		6.025	
Ind. Harbor Y1.				8.775			
Johnstown B3 Joliet U1		6.00					
Joliet Ul	5.075		6.35				
Kansas City S2.				8.775			
Lackawanna B3	5.075	6.00	6.35			6.025	
Lebanon B3							13.10
Minnegus C6	5.075	6.50	6.35	8.775		6.025	13.10
Pittsburgh P5				8.775	12.85		
Pittsburgh /3				8.775			13, 16
Seattle B2				9.275		6.175	13.16
Seattle B2 Steelten B3	5.075		6.35			6.025	13.10
Struthers Y1				8.775			
Torrance C7							
Williamsport S5		6.15					
Youngstown R3.				8.775			

#### COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa \$14.50 to \$14.75
Foundry, beehive (f.o.b. oven)
\$17.00 to \$18.00
Foundry, oven coke
Buffalo, del'd\$30.75
Detroit, f.o.b 29.50
New England, del'd 30.55
Seaboard, N. J., f.o.b 28.75
Philadelphia, f.o.b 28.50
Swedesland, Pa., f.o.b 28.50
Painesville, Ohio, f.o.b 29.50
Erie, Pa., f.o.b
Cleveland, del'd 31.55
Cincinnati, del'd 28.59
St. Paul, f.o.b 28.50
St. Louis, f.o.b 30.50
Birmingham, f.o.b 27.60
Milwaukee, f.o.b 29.50
Lone Star, f.o.b

#### **ELECTRODES**

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

G	RAPHITE		CARBON*			
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price	
24 20 16 to 18 14 12 10 10 7 6 4 3 2 <sup>1</sup> / <sub>2</sub>	84 72 72 72 72 72 60 48 60 60 40 40 30 24	24.73 24.80 24.50 25.00 25.50 27.00 26.75 30.00 33.25 35.25 37.75	48 35 30 24 20 17 14 12 10 8	100, 110 110 110 72 to 84 90 72 72 72 60 60	10.70 10.70 10.85 11.25 11.00 11.40 11.85 12.95 13.00 13.30	

<sup>\*</sup> Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES
Anodes
(Cents per lb, frt allowed in quantity) Copper
Cast elliptical, 18 in. or longer, 5000 lb lots
or more
Nickel, 99 pct plus, rolled carbon 90.50 (rolled depolarized add 3¢ per lb)
Cadmium
Chemicals
(Cents per Ib, f.o.b. shipping point)
Copper cyanide, 100 lb drum 80.50 Copper sulphate, 5 or more 100 lb
bags, per cwt 20.65
Nickel salts, single, 100 lb bags 38.25 Nickel chloride, freight allowed,
300 lb
N. Y., 200 lb drums
Zinc cyanide, 100 to 900 lb 55.55 Potassium cyanide, 100 lb drum
N. Y. 48.00 Chromic acid, flake type, 1 to 20
100 lb drums

# BOLTS, NUTS, RIVETS, SCREWS (Base discount, f.o.b. mill) Pet Discounts

Machine and Carriage Bolts	Full Con- tainer Price	30 Con- tainers	20,000 Lb.	40,000 Lb.
%" and smaller x 6"	55	5834	603/2	6134
than 6"	4634	80	523-6	54
Rolled thread carriage bolts 1/2 in. & smaller x 6 in. and shorter	35	583/2	603/2	6134
Lag, all diam. x 6" &	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, ½" and smaller x 6" and shorter	54	573%	59	60

(Add 25 pct for broken case	-	Case or
Nuts, Hex, HP reg. & hvy.	K	g Price
% in. or smaller		63 59 1/4 64 58
C.P. Hex regular & hvy.		
% in. and smaller		63 59 1/2 58
Hot Galv. Nuts (All Types)		
%" and smaller		50
Semi-finished Hex Nuts		

% in. and smaller	63
% in. to 1½ in. inclusive	59 1/2
(Add 25 pct for broken case quantities)	or keg
Bt-t-k-4	

1" and smaller ..... 65

### Rivets

							1	Bas	36	per	100	16
1/2	in.	and	larger	0.0	0	 . 0				Pet (		
7/1	6 in	n. an	d small	er						Pet C	26	1/2

## Cap Screws

Bright Tre		Package H. C. He
New std. hex head, pack- aged		
%" diam, and smaller x		
6" and shorter x	47	34
6" and shorter	31	13
longer than 6"	181/2	+ 1
%", %" and 1" diam.	5 14	+1914

					Fu	Il-Fin	ished
					Ca	rtons	Bulk
	through					-	
8.1	nd shorte	r				47	63
%"	through	1"	dia.	x	6"		

C-1018 Steel

#### Machine Screws & Stove Bolts

		Disco	ount
Plain Finish Cartons Bulk	Quantity	Mach. Screws 19	Stov Bolts 32
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to 1/2" diam. incl.	15,000-100,000	9	54
All diam. over 3"	5,000-100,000	_	54

### Machine Screw & Stove Bolt Nuts

		Dis	count
In cartons	Quantity	Hex 16	Square 19
In Bulk	Quantity		
diam. & smaller	} 15,000-100,000	7	9

## CAST IRON WATER PIPE INDEX

							 -		
Birming									
New Yo	rk						 		131.4
Chicago									
San Fra									
Dec.									
6 in. or									
planatio							6.	80	urce:
U. S. P	ipe an	rd i	ou	ndi	ru (	70.			

#### REFRACTORIES

Fire Clay Brick Carloads per 1000	Ó
First quality, Ill., Ky., Md., Mo., Ohio, Pa	ĺ.
(except Salina, Pa., add \$5.00) \$128.00	0
No. 1 Ohio 128.00	
Sec. quality, Pa., Md., Ky., Mo., Ill. 114.00	
No. 2 Ohio 98.00	Ð
Ground fire clay, net ton, bulk	
(except Salina, Pa., add \$2.00) 20.00	9

#### Silica Brick

Silied Biles
Mt. Union, Pa., Ensley, Ala \$140.00 Childs, Hays, Pa
Western Utah144.00-165.00
California 170.00
Super Duty
Hays, Pa., Athens, Tex., Wind-
ham, Warren, O., Morrisville
150.00-157.00
Silica cement, net ton, bulk, Latrobe 26.50 Silica cement, net ton, bulk, Chi-
cago 24.00 Silica cement, net tons, bulk, Ens-
ley, Ala
Union 23.00
Silica cement, net ton, bulk, Utah and Calif 35.00

Chrome Brick		Per n	et ton
	nically bonded, mically bonded,		\$98.00
iner, Calif. Burned, Balt.			108.00 92.00

#### Magnesite Brick

Standard,	Baltimor	e			 	\$121.00	
Chemically	bonded.	Balti	mor	6	 	109.00	

	gnesite St. % to 1/2-in. g	
	f.o.b. Chewalah, Wash.,	
in bull		43.00
in sac	8	49.0

***			
Dead	Burned	Dolomite	Per net ton
F.o.b.	bulk, pr	oducing points, Ohio	in:
Mid	west .		16.35
M 18	souri Va	lley	15.00

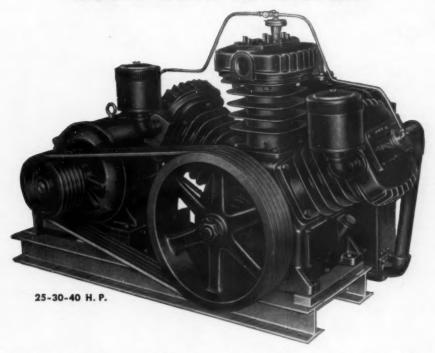
Per pound, to b. shipping point, in ton

### **METAL POWDERS**

lote for minus 100 meek
lots, for minus 100 mesh
Swedish sponge iron f.o.b.
Riverton, N. J., ocean bags 8.50¢
Canadian sponge iron,
Del'd in East, carloads 9.5¢
Domestic sponge iron, 98+%
Fe, carload lots 8.5¢
Electrolytic iron, annealed,
imported 99.5+% Fe 27.5¢
domestic 99.5+% Fe 36.5¢
Electrolytic iron, unannealed
minus 325 mesh, 99+% Fe 57.0¢
Electrolytic iron melting
stock, 99.84% pure 22.0¢
Carbonyl iron size 5 to 10
micron, 98%, 00.8+% Fe86.0¢ to \$1.55
Aluminum freight allowed . 38.00¢
Brass, 10 ton lots 37.50¢ to 50.00¢
Copper electrolytic 59.50¢
Copper, reduced 59.50¢
Cadmium, 100-199 lb, 95¢ plus metal value
Chromium, electrolytic 99.85%
min. Fe .03 max. Del'd \$5.00
Lead 8.90¢ plus metal value
Manganese 70.0¢
Molybdenum, 99% \$3.35 to \$3.85
Nickel, unannealed \$1.00
Nickel, annealed
Nickel, spherical, unannealed
#80 \$1.13
#80 \$1.13 Silicon 43.50¢
Solder power 7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 99.0¢
Stainless steel, 302 99.0¢
Stainless steel, 316 \$1.32
Tin
Tungsten, 33% (so mesh) \$4.50
Zinc, 10 ton lots 18.75¢ to 32.50¢

THE NEW CURTIS MODEL C-100 TWO-STAGE, AIR-COOLED AIR COMPRESSOR

# **Provides Higher Operating Efficiency** Costs Less to Install



THIS NEW Curtis Two-Stage will deliver more air per minute, per horsepower and per kilowatt hour of electrical energy consumed, thus assuring a saving in your electrical bill.

> It's Air Cooled, thereby eliminating expensive water bills and assuring quick and easy installation with no complicated plumbing problems.

> The new C-100 embodies all the well-known Curtis engineering features such as centro-ring oiling and Timken Main Bearings.

For complete information write for illustrated folder.



MANUFACTURING COMPANY . PNEUMAT

1948 KIENLEN AVE.

ST. LOUIS 20, MO.

CM-6











# Ferroalloy Prices (Effective Nov. 6, 1956)

Ferrochrome Contract prices, cents per lb contained	Spiegeleisen Contract prices, per gross ton, lump.	Alaifer, 20% Al. 40% Si, 40% Fe. Contract basis, f.o.b. Suspen-	
Cr. lump, bulk, carloads, del'd, 67-71%	Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.	sion Bridge, N. Y., per lb. Carloads	050
Cr30-1.00% max. St. 0.02% C 41.50 0.20% C 38.50	Manganese Silicon 16 to 19% 3% max	Ton lots 11	.80¢
0.03% C 41.00 0.50% C 38.25 0.06% C 39.50 1.00% C 37.50	16 to 19% 3% max. \$97.50 19 to 21% 3% max. 99.50 21 to 23% 3% max. 102.00	f.o.b. Langeloth, Pa., per pound	
0.02% C . 41.50 0.20% C . 38.50 0.03% C . 41.00 0.50% C . 38.25 0.06% C . 39.50 1.00% C . 37.50 0.10% C . 39.00 1.50% C . 37.35 0.15% C . 38.75 2.00% C . 37.25 4.00-4.50% C, 67.70% Cr. 1.2% St. 27.75 81		Contained Mo	1.28
4.00-4.50% C, 67.70% Cr, 1-2% Si 27.75	Manganese Metal	Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered	
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75	Contract basis, 2 in. x down, cents per pound of metal, delivered.	per pound contained Cb.	
S1 21.15 0.025% C (Simplex) 34.75 0.10% C, 50-52% Cr. 2% max Si 35.75 8.50% max C, 50-55% Cr. 3-6% Si 24.00 8.50% C, 50-55% Cr. 3% max Si 24.00	95.50% min. Mn. 0.2% max. C, 1% max.		6.90
8.50% max. C, 50-55% Cr. 8-6% St. 24.00	Si, 2.5% max. Fe. Carload, packed	Ferro-tantalum-columbium, 20%	
8.50% C, 50-55% CF, 8% max S1 24.00	100 1008	Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x	
High Nitrogen Ferrochrome	Electrolytic Manganese	D per lb con't Sb plus Ta \$	4.95
Low-carbon type 0.75% N. Add 5¢ per ib to regular low carbon ferrochrome	F.o.b. Knoxville, Tenn., freight allowed	Ferromolybdenum, 55-75%, 200-1b containers, f.o.b. Langeloth,	
max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.	east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.		1.54
	Carloads	Ferrophosphorus, electric, 23- 26%, car lots, f.o.b. Siglo, Mt.	
Contract prices per lh chromium con-	Ton lots	Pleasant, Tenn., \$4.00 unitage, per gross ton	00.00
Contract prices, per lb chromium con- tained, packed, delivered, ton lots, 97%	metal 0.76	10 tons to less carload\$11	0.00
min. Cr, 1% max. Fe. 0.10% max. C	Madium Carbon Engagementare	Ferrotitanium, 40 % regular grade, 0.10 % C max., f.o.b. Niagara	
9 to 11% C, 33-91% Cr, 0.75% Fe. 1.40	Mn 80 to 85%, C 1.25 to 1.50, St 1.50%	0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots,	
	max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn 24.15	per lb contained Ti \$	1.35
Contract prices per lb of metal 2" x D	donivered, per to or contained Min \$4.10	Ferrotitanium, 25% low carbon	
plate (%" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.	Low-Carb Ferromanganese	0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots,	
Carloads \$1.29	Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.	per 10 contained Ti	\$1.50
Ton lots	Carloads Ton Less	Less ton lots	\$1.55
Low Carbon Ferrochrome Silicon	0.07% max. C, 0.06% P, 90% Mn 35.80 38.60 39.80 0.07% max. C 23.75 36.55 37.75	Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y. freight allowed, car-	
(Cr 34-41%, Si 42-45%, C 0.05% max.)	P. 90% Mn. 33.85 88.80 37.85 0.10% max. C 33.75 36.55 37.75 0.10% max. C 32.25 35.05 36.25 0.30% max. C 30.75 33.55 34.75 0.50% max. C 30.25 33.05 34.25 0.75% max. C, 80.85% Mn, 5.0-7.0% Si 27.25 30.05 31.25	N. Y. freight allowed, car- load, per net ton\$21	15.00
Contract price, carloads, delivered, lump, 8-in. x down, per lb of Cr, packed.	0.30% max. C 32.25 35.05 36.25	Ferrotungaten, W x down	10.00
Carloads 44.65	0.50% max. C 30.25 33.05 34.26	packed, per pounds contained	\$3.15
Ton lots	Mn, 5.0-7.0% Si 27.25 30.05 31.25	Molybdie oxide, briquets, per lb	90.10
Calcium-Silicon	****	contained Mo, f.o.b. Langeloth,	\$1.32
Contract price per lb of alloy, lump,	Silicomanganese	hage fob Weshington Do	
delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.	Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Sl, 1.5% max. C for 2% max. C, deduct 0.2¢	Langeloth, Pa	\$1.30
30-33% Cr, 60-65% Si, 3.00 max. Fe. Carloads 25.65 Ton lots 27.95	1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b shipping point.	Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.	
Less ton lots 29.45	f.o.b shipping point. 12.95 Carloads bulk 12.95 Ton lots 14.60 Briquet contract basis carloads, bulk,	Carload, bulk lump 1	8.50€
Calcium-Manganese—Silicon	Briquet contract basis carloads, bulk, delivered, per lb of briquet 14.40	Ton lots, packed lump 2 Less ton lots 2	0.50¢
Contract policy contains the of alless	delivered, per ib of briquet 14.40		
Contract prices, cents per lb of alloy,	Ton lots, packed 16.80	Vanadium oxide, 86-89% V <sub>2</sub> O <sub>8</sub>	
lump, delivered, packed.  16-20% Ca, 14-18% Mn, 53-59% Si.	Ton lots, packed 16.80	contract basis, per pound contained V <sub>2</sub> O <sub>8</sub>	\$1.35
lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Sl. Carloads	Silvery Iron (electric furnace)	contract basis, per pound con- tained V <sub>2</sub> O <sub>8</sub>	
Contract prices, cents per is of alloy, lump, delivered, packed.  16-20% Ca, 14-18% Mn, 53-59% Sl. Carloads	Silvery Iron (electric furnace) Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35
lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Sl. Carloads 24.25 Ton lots 26.15 Less ton lots 27.15	Silvery iron (electric furnace) Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls,	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢
lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Sl. Carloads 24.25 Ton lots 26.15 Less ton lots 27.15	Silvery Iron (electric furnace) Si 15.50 to 16.00 pet, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area.	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35
lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Si. Carloads	Silvery Iron (electric furnace) Sil 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢
lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Sl. Carloads 24.25 Ton lots 26.15 Less ton lots 27.15	Silvery Iron (electric furnace) Sil 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub> .  Zirconium contract basis, per lb of alloy 35-40% f.o.b. freight allowed, carloads, packed 2 12-15%, del'd lump, bulk-carloads  Boron Agents  Borosil, contract prices per lb of	\$1.35 27.25¢
lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Si. Carloads	Silvery Iron (electric furnace) Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal Contract price, cents per pound contained Si, lump size, delivered, packed.	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢
lump, delivered, packed. 16-20% Ca, 14-15% Mn, 53-59% Sl. Carloads 24.25 Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 meah. Ton lots 20.15 Less ton lots 21.40  V Foundry Alley	Silvery Iron (electric furnace) Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$92.00.  Silicon Metal Contract price, cents per pound contained Si, lump size, delivered, packed. Ton lots Carloads 96.50% Si, 2% Fe 23.95 22.66	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢
lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-50% Sl. Carloads Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 21.40  V Foundry Alley Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19%	Silvery Iron (electric furnace) Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal Contract price, cents per pound contained Si, lump size, delivered, packed.	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50
lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Si. Carloads Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed.	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 25.50 81, 2% Fe 23.55 22.65 28% SI, 0.75% Fe 24.45 23.15	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢
lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Si. Carloads Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed.	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 25.50 81, 2% Fe 23.55 22.65 28% SI, 0.75% Fe 24.45 23.15	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50 45¢
lump, delivered, packed. 16-20% Ca, 14-13% Mn, 53-50% Sl. Carloads 24.25 Ton lots 25.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed. Carload lots 17.20 Ton lots 18.70 Less ton lots 19.35	Silvery Iron (electric furnace) Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal Contract price, cents per pound contained Si, lump size, delivered, packed. Ton lots Carloads 96.50% Si, 2% Fe 23.95 22.66 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets.	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50 45¢
lump, delivered, packed. 16-20% Ca, 14-15% Mn, 53-50% Sl. Carloads 24.25 Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in x 12 meah.  Ton lots 21.40  V Foundry Alloy  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed.  Carload lots 17.20 Ton lots 18.70 Less ton lots 19.35  Graphidox No. 4	Silvery Iron (electric furnace) Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal Contract price, cents per pound contained Si, lump size, delivered, packed. Ton lots Carloads 96.50% Si, 2% Fe 23.95 22.66 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si.	contract basis, per pound contained Y <sub>c</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50 45¢ 50¢
lump, delivered, packed. 15-20% Ca, 14-15% Mn, 53-50% Sl. Carloads Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 18.70 Less ton lots 18.70 Less ton lots 19.35  Graphidox No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, No. 4	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 96.50% Si, 2% Fe 23.95 22.66 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 ib Si. briquets.  Carloads, bulk 7.65  Ton lots, packed 10.35	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50 45¢ 50¢
lump, delivered, packed. 16-20% Ca, 14-15% Mn, 53-50% Sl. Carloads 24.25 Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 17.20 Ton lots 18.70 Less ton lots 19.35  Graphidex No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 19.35  Graphidex No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca. 5 to 7%.	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash, \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 95.50 81, 2% Fe 23.95 22.66 98% SI, 0.75% Fe 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets. Carloads, bulk 7.55 Ton lots, packed 10.35  Electric Ferrosilicon	contract basis, per pound contained V <sub>c</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50 45¢ 50¢
lump, delivered, packed. 16-20% Ca, 14-15% Mn, 53-50% Sl. Carloads 24.25 Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 17.20 Ton lots 18.70 Less ton lots 19.35  Graphidex No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 19.35  Graphidex No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca. 5 to 7%.	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 98.81, 0.75% Fe 23.95 22.65 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets.  Carloads, bulk 7.55  Ton lots, packed 7.55  Ton lots, packed 10.35  Electric Ferrosilicon  Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping	contract basis, per pound contained V <sub>c</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50 45¢ 50¢
lump, delivered, packed. 16-20% Ca, 14-15% Mn, 53-59% Sl. Carloads Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 meah. Ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed. Carload lots 18.70 Less ton lots 18.70 Less ton lots 19.95  Graphidox No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Sl, 8-15% Mn, packed. Carload lots 18.70 Less ton lots 18.70 Less ton lots 19.95	Silvery Iron (electric furnace) Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal Contract price, cents per pound contained Si, lump size, delivered, packed. Carloads 98.50% Si, 2% Fe 23.95 22.65 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets. Carloads, bulk 7.55 Ton lots, packed 7.55  Electric Ferrosilicon Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50 45¢ 50¢ 14.00¢ 1.20
lump, delivered, packed. 16-20% Ca, 14-15% Mn, 53-50% Sl. Carloads 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 17.20 Ton lots 18.70 Less ton lots 19.95  Graphidox No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload packed 18.50 Carload packed 18.50 Ton lots to carload packed 19.55	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 98.81, 0.75% Fe 23.95 22.65 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets.  Carloads, bulk 7.55  Ton lots, packed 7.55  Ton lots, packed 10.35  Electric Ferrosilicon  Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50 45¢ 50¢ 14.00¢
lump, delivered, packed. 16-20% Ca, 14-13% Mn, 53-50% Sl. Carloads 26.15 Less ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 21.40  V Foundry Alloy Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed. Carload lots 17.20 Less ton lots 18.70 Less ton lots 19.95  Graphidox No. 4 Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%. Ca. 5 to 7%. Carload packed 18.50 Ton lots to carload packed 19.55 Less ton lots 20.90  Ferromangaesse Maximum contract base price, f.o.b.	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 98.8% Si, 0.75% Fe 23.95 22.65 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets. Carloads, bulk 7.55  Ton lots, packed 10.35  Electric Ferrosilicon  Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point. 50% Si 13.50 75% Si 16.40 65% Si 15.25 35% Si 18.10 90% Si 19.50	contract basis, per pound contained Y <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50 45¢ 50¢ 14.00¢ 1.20
lump, delivered, packed. 16-20% Ca, 14-13% Mn, 53-50% Sl. Carloads 26.15 Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 21.40  V Foundry Alley Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed. Carload lots 17.20 Less ton lots 18.70 Less ton lots 19.95  Graphidox No. 4 Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%. Ca. 5 to 7%. Carload packed 18.50 Ton lots to carload packed 19.55 Less ton lots 20.90  Ferromangasese  Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn. Cents	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 96.50% Si, 2% Fe . 23.95 22.66 98% Si, 0.75% Fe . 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 ib Si. briquets. Carloads, bulk 7.55 Ton lots, packed	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.35 27.25¢ 9.25¢ \$5.50 45¢ 50¢ 14.00¢ 1.20
lump, delivered, packed. 16-20% Ca, 14-15% Mn, 53-50% Sl. Carloads Ton lots Less ton lots  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed. Carload lots  Carload lots  Graphidax No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed. Carload lots  Graphidax No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%. Carload packed  Ton lots to carload packed  Ton lots to carload packed  Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn. Cents per-lon.	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, treight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falis, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 96.50% Si, 2% Fe 23.95 22.66 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets. Carloads, bulk 7.55  Ton lots, packed 10.35  Electric Ferrosilicon  Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point. 50% Si 13.50 76% Si 18.10 90% Si 19.50  Calcium Metal  Eastern zone contract prices, cents per pound of metal, delivered.	contract basis, per pound contained V <sub>c</sub> O <sub>2</sub>	\$1.3a 27.25¢ 9.25¢ \$5.50 45¢ 50¢ 1.20 1.50
lump, delivered, packed. 16-20% Ca, 14-15% Mn, 53-50% Sl. Carloads 24.25 Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 17.20 Ton lots 18.70 Less ton lots 18.70 Less ton lots 18.70 Less ton lots 19.35  Graphidax No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Tl 9 to 11%, Ca 5 to 7%. Carload packed 18.50 Ton lots to carload packed 19.65 Less ton lots 20.90  Ferromanganese  Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn. Cents Producing Point Marietta, Ashtabula, O.: Alloy, W. Va.: Sheefield Ala; Portland.	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash, \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 95.50 81, 2% Fe 23.95 22.66 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets. Carloads, bulk 7.55  Ton lots, packed 10.35  Electric Ferrosilicon  Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point. 50% Si 13.50 75% Si 16.40 65% Si 15.25 85% Si 18.10 90% Si 19.50  Calcium Metal  Eastern zone contract prices, cents per pound of metal, delivered. Cast Turnings Distilled Ton lots \$2.05 \$2.95 \$3.75	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.38 27.25¢ 9.25¢ \$5.50 45¢ 50¢ 1.20 1.50
lump, delivered, packed. 16-20% Ca, 14-15% Mn, 53-50% Sl. Carloads 24.25 Ton lots 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh. Ton lots 20.15 Less ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 17.20 Ton lots 18.70 Less ton lots 18.70 Less ton lots 18.70 Less ton lots 19.35  Graphidax No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Tl 9 to 11%, Ca 5 to 7%. Carload packed 18.50 Ton lots to carload packed 19.65 Less ton lots 20.90  Ferromanganese  Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn. Cents Producing Point Marietta, Ashtabula, O.: Alloy, W. Va.: Sheefield Ala; Portland.	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 98.50 81, 2% Fe 23.95 22.66 98% Si, 0.75% Fo 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets. Carloads, bulk 7.55  Ton lots, packed 10.35  Electric Ferrosilicon  Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point. 50% Si 13.50 75% Si 18.10 90% Si 19.50  Calcium Metal  Eastern zone contract prices, cents per pound of metal, delivered, delivered, cast Turnings Distilled	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.38 27.25¢ 9.25¢ \$5.50 45¢ 50¢ 1.20 1.50
lump, delivered, packed.  16-20% Ca, 14-15% Mn, 53-50% Sl. Carloads 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr.  20% Fe ½ in x 13 mesh. Ton lots 20.15 Less ton lots 21.40  V Foundry Alloy  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 17.20 Ton lots 18.70 Less ton lots 19.95  Graphidax No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% St. 18.70 Less ton lots 19.95  Graphidax No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%, Carload packed 18.50 Ton lots to carload packed 18.50 Ton lots to carload packed 19.55 Less ton lots 20.90  Ferromagasese  Maximum contract base price, f.o.b., lump size, base content 74 to 76 pet Mn. Cents per-load packed 20.90  Forducing Point Marietta, Ashtabula, O.: Alloy, W. Va.; Sheffield, Ala; Portland, Ore. 11.75 Sheridan, Pa. 11.75 Sheridan, Pa. 11.75 Sheridan, Pa. 11.75	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 98.50 Si, 2% Fe 23.95 22.66 98% Si, 0.75% Fe 23.95 22.66 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 ib Si. briquets.  Carloads, bulk 7.65  Ton lots, packed 10.35  Electric Ferrosilicon  Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point. 50% Si 13.50 75% Si 18.10 90% Si 19.50  Calcium Metal  Eastern zone contract prices, cents per pound of metal, delivered, delivered, Cast Turnings Distilled Ton lots \$3.05 \$2.95 23.75 Less ton lots 2.40 3.30 4.55	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub> .  Zirconium contract basis, per lb of alloy 35-40% f.o.b. freight allowed, carloads, packed	\$1.38 27.25¢ 9.25¢ \$5.50 45¢ 50¢ 1.20 1.50
lump, delivered, packed.  16-20% Ca, 14-15% Mn, 53-50% Sl. Carloads 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr.  20% Fe ½ in. x 13 mesh. Ton lots 20.15 Less ton lots 20.15 Less ton lots 21.40  V Foundry Alloy  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed. Carload lots 17.20 Ton lots 18.70 Less ton lots 19.95  Graphidox No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed. Carload lots 19.95  Graphidox No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%. Carload packed 18.50 Ton lots to carload packed 18.50 Ton lots to carload packed 19.65 Less ton lots 20.90  Ferromagaesse  Maximum contract base price, f.o.b., lump size, base content 74 to 76 pet Mn. Cents per-low Marietta, Ashtabula, O.: Alloy, W. Va.; Sheffield, Ala; Portland, Ore. 11.75 Sheridan, Pa. 11.75 Sheridan, Pa. 11.75 Sheridan, Pa. 11.75 Add or subtract 0.1¢ for each 1 pet Mn	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 96.50% Si, 2% Fe 23.95 22.66 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets. Carloads, bulk 7.55 Ton lots, packed 10.35  Electric Ferrosilicon  Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point. 15.25 85% Si 18.10 90% Si 19.50  Calcium Metal  Eastern zone contract prices, cents per pound of metal, delivered. Cast Turnings Distilled Ton lots \$2.05 \$2.95 \$3.75  Less ton lots 2.40 3.30 4.55  Ferrovanadium 50-55% V contract, basis, delivered, per	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.38 27.25¢ 9.25¢ \$5.50 45¢ 50¢ 1.20 1.50 \$1.05 50¢
lump, delivered, packed.  16-20% Ca, 14-15% Mn, 53-50% Sl. Carloads 26.15 Less ton lots 27.15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-65% Sl, 5-7% Mn, 5-7% Zr.  20% Fe ½ in x 12 mesh. Ton lots 20.15 Less ton lots 20.15 Less ton lots 21.40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 17.20 Ton lots 18.70 Less ton lots 19.95  Graphidox No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Si, 8-11% Mn, packed. Carload lots 19.95  Graphidox No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%. Ca 5 to 7%. Carload packed 18.50 Ton lots to carload packed 19.55 Less ton lots 20.90  Ferromangasese  Maximum contract base price, f.o.b., lump size, base content 74 to 76 pet Mn. Cents per-load packed 1.75 Less ton lots 11.75 Sheridan, Pa. 11.75 Sheridan, Pa. 11.75 Sheridan, Pa. 11.75 Add or subtract 0.1¢ for each 1 pet Mn above or below base content. Briqueta delivered, 66 pet Mn:	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal  Contract price, cents per pound contained Si, lump size, delivered, packed.  Ton lots Carloads 95.50 Si, 2% Fe 23.95 22.65 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets  Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets.  Carloads, bulk 7.55  Ton lots, packed 10.35  Electric Ferrosilicon  Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point. 50% Si 13.50 76% Si 16.40 65% Si 15.25 35% Si 18.10  Calcium Metal  Eastern zone contract prices, cents per pound of metal, delivered.  Cast Turnings Distilled  Ton lots \$2.05 \$2.95 \$3.75  Lees ton lots 2.40 3.30 4.56  Ferrovanadium  50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub>	\$1.3a 27.25¢ 9.25¢ 9.25¢ \$5.50 45¢ 50¢ 1.20 1.50 \$1.05 50¢
lump, delivered, packed.  16:20% Ca, 14:13% Mn, 53-59% Sl. Carloads 24:15 Ton lots 25:15 Less ton lots 27:15  SMZ  Contract prices, cents per pound of alloy, delivered, 60-85% Sl, 5-7% Mn, 5-7% Zr.  20% Fe ½ in x 12 mesh. Ton lots 20:15 Less ton lots 21:40  V Foundry Alley  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed. Carload lots 17:20 Ton lots 18:70 Less ton lots 19:95  Graphidox No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr., 17-19% Sl, 8-11% Mn, packed. Carload pots 19:95  Graphidox No. 4  Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Tl 9 to 11%, Ca 5 to 7%. Carload packed 18:50 Ton lots to carload packed 18:50 Ton lots to carload packed 19:65 Less ton lots 20:90  Ferromagaesse  Maximum contract base price, f.o.b., lump size, base content 74 to 76 pet Mn. Cents per-low Marietta, Ashtabula, O.: Alloy, W. Va.; Sheffield, Ala.; Portland, Ore. 11.75 Sheridan, Pa 11.75 Sheridan, Pa 11.75 Sheridan, Pa 11.75 Add or subtract 0.1¢ for each 1 pet Mn	Silvery Iron (electric furnace)  Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.  Silicon Metal Contract price, cents per pound contained Si, lump size, delivered, packed. Ton lots Carloads 95.50 Si, 2% Fe 23.95 22.65 98% Si, 0.75% Fe 24.45 23.15  Silicon Briquets Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets. Carloads, bulk 7.55 Ton lots, packed 10.35  Electric Ferrosilicon Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point. 50% Si 15.25 35% Si 18.10 65% Si 15.25 35% Si 18.10  Calcium Metal Eastern zone contract prices, cents per pound of metal, delivered. Cast Turnings Distilled Ton lots \$2.05 \$2.95 \$3.75 Less ton lots 2.40 3.30 4.55  Ferrovanadium 50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.	contract basis, per pound contained V <sub>2</sub> O <sub>2</sub> .  Zirconium contract basis, per lb of alloy 35-40% f.o.b. freight allowed, carloads, packed	\$1.3a 27.25¢ 9.25¢ 9.25¢ \$5.50 45¢ 50¢ 1.20 1.50 \$1.05 50¢



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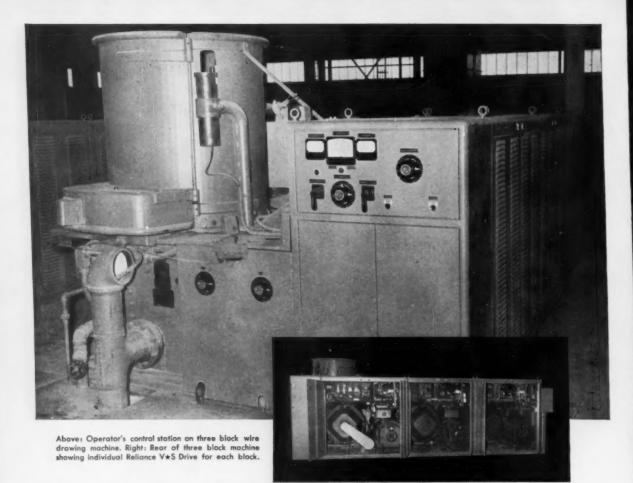
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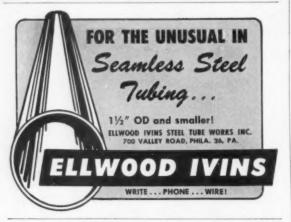
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# JANUARY 3

# Metalworking's Growing Markets

is the theme of the 1957 IRON AGE

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COVERED IN DETAIL will be . . . the 1957 Market (forecast of markets for all leading metals); Markets for Metalworking (market outlook for more than a score of metalworking industries, and major articles on aluminum, copper, steel); New Customers—5 Every Minute (effects of population growth, geographic trends on expansion and plant location); America's No. 1 Customer (where spending emphasis of Uncle Sam's "billions in business" will be); America's No. 1 Information Source (where to find your best marketing information); PLUS . . . Production and Price Data, Trade Association Directory, and other reference—value features essential to metalworking management planning.

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# **News of Used and Rebuilt Machinery**

Good on the Coast . . . Up and down the West Coast used machinery business is hotter than ever. Here's an up-to-the-minute rundown:

In northern California used machinery dealers are enjoying good business and the outlook is for more of the same. Dealers say sales are anywhere from 5 pct and 10 pct ahead of last year to 30 pct and 35 pct ahead.

Machinery people note they are just beginning to feel the effects of this wave of new business, and think the full impact will hit next year. And after the initial heavy buying, dealers point out, comes the added purchases of accessories that will follow. Things like light equipment, chucks, reamers and other items will sustain demand for at least another year, one executive predicted.

New Firms Aid... This spokesman estimated about 15 pct to 20 pct of his firm's current gain of some 30 pct over last year can already be attributed to the new industries springing up in this region.

Dollar volume of sales will climb even faster than unit volume, one executive observed, because of steadily mounting prices. He figures used machinery is now up about 10 pct to 20 pct over 1955. Recent hikes ran from 5 pct to 10 pct, he explained.

Now They'll Wait . . . Although some dealers still are reaching back East for equipment in short supply or not available on the Coast, the amount of such imports is down sharply. Large-size and automatic equipment head the import list.

Machinery customers up to recently were unwilling to wait at all for what they wanted. Now they'll go along with a 4 to 6 month delay, another dealer reported. To emphasize how firm prices are on used equipment, one San Francisco dealer told of bidding over \$10,000 on a piece of 14-year-old equipment in Chicago—a machine that cost \$12,000 when new. It went for \$14,000, he said, in its damaged condition. He figures it will be sold for about \$20,000 after shipping costs are included. And, as he defines it, this is a typical case.

Those Most Wanted . . . In southern California, the picture's much the same—business is very good and will stay so well into next year. Dealers are still hot and heavy after good used equipment in eastern and midwestern markets. Even 12-year-old machines bring healthy prices.

Heading the most needed list are grinders and big planers 8 ft and 10 ft wide and 20 ft long. Aircraft and guided missile plants want the planers for conversion to duplicators and spar millers.

Current best seller list in southern California includes engine lathes, boring mills, grinders, planers. Sheet metal equipment continues to move briskly. Press brakes, shears, and punch presses are moving to electronics firms and companies making products for the home and office building industries.

And In Seattle ... In the Seattle used machinery market, dealers report an increase of from 5 pct to 10 pct over a few months ago. What's behind it? Expanding subcontracting work by Boeing Airplane Co. and increasing optimism on the part of most metalworking firms.

Large metalworking machinery and equipment, costing over \$50,000, is in scarce supply. An increasingly short supply is developing now for good condition and fairly new lathes and milling machines.

# CONSIDER GOOD USED EQUIPMENT FIRST

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10' x ¼ " Superior Hydraulic12' x ½ " Superior Hydraulic10' x ¼ " Cincinnati—LaTE

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44" Newbold, Nine Rolls 4" Dia.
54" Astra Standard, 17 Rolls 3%" Dia.
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72" McKray, 17 Rolls 44%" Dia.
78 PRESSES—HYDRAULIC
500 ton Elmes 18" Stroke Lower Piaten 88" x 68"
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1200 ton United Steam Hydraulic Forging Frees
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25% x 26%"
78 PRESSES—STRAIGHT SIDE
Clearing Model TF41500-200 Triple Acting Strokes
40 32, 14" Bed Area 100" x 200"
100 ton Clearing 14" Stroke, 39" x 36" Bed
250 ton Toledo, 6" Stroke, 38" x 38" Bed
150 ton Toledo, 6" Stroke, 58" x 13" Bed
150 ton Toledo, 6" Stroke, 58" x 13" Bed
150 ton Toledo, 6" Stroke, 58" x 13" Bed
118 Ton Punches in flange & web of H-Beams,
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Shear 1½" Rd., 1%" Sq. 3 x 3 x %" Angles
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Toleveland Style G Single End, 60"
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72" Bertsch Seven Bolls, 7" Dia,
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ROLLING MILLS
10" x 16" Single Stand, Two High

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12" x 16" Phila. Single Stand, Two High 15" x 20" G & M Single Stand, Two High 16" x 24" Farrel Two Stand, Two High 20" x 60" Two High Breakdown Milli 26" x 54" United Single Stand, Two High 26" x 72" Cold Rolling Mill 24" x 14" Three High Sheet Mill 22" x 40" Three High Sheet Mill 28" x 40" Three High Sheet Mill 28" x 40" Three High Sheet Mill 80" x 3" Pels Model S T A U—22, All Steel SHEAR—6ATE 80" x %" Pels Model S T A U-22 All SHEARS—ROTARY #23A Quickwork Whiting, 3/16" Capy. #250 Kling, %" Capy. BHEARS—SQUARING 8" x %" Niagara, LATE 10" x %" Cinclinati, LATE 16" x %" Toledo 16' z % Totsoo
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No. 3C Chambersburg pneumatic, serial No. 2287. No. 6-1 Nazel, pneumatic, late. No. 6B Nazel, self-contained.

No. 3 Gishoit Univ. Turret Lathes (2), 1942. No. 5 Gishoit ram type Univ. Turret Lathe, 1949. 14" x 8" Hendey Teoiroom, 1940. 15" x 30" Lise Carbo-Matle, 1942. 36" and 42" Bullard New Era vertical turret lathes. 128" x 96" CC Niles Bessent Pond engine lathe, 60 HP, M.D.

No. 2 Brewn & Sharpe vertical mill, new 1943. No. 4 Cincinnati high power plain horizontal mill, serial E 506 J. No. 5-48 Cincinnati hydrometlo duplex mill, serial 383101K-5.

3B51D1K-5. No. 2-24 Cincinnati automatic simplex mill, serial No. 1B3P1T-1.

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90 ton No. 92½°C Toledo D.C. Str. Sids.
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2000 ton No. 6 National Maxieress Ferging Press.

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4" National Upsetter High Duty, guided ever-orm slide, air clutch

Alax & National Upsetters, suspended silde, 2½,", 2", 4"; similar upsetters not suspended silde, ¾,", 1", 1½,", 2", 2", 3"

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700.tea Aire, Mink Spand Forging, Bene 700-ton Ajax High Speed Forging Press 50,000# Standard Double Draw Bench

#3 Abromson Bor & Tube Straightener
Pels FV-75 Bor & Biller Shear, Cap. 7%" rd
10' x ½" Flate Shear, Long & Allstatter 19"
throat, M.D. Rebuilt
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3	1250	720	G.E.	600	2300/4160
1	1000	739	Whse,	600	2300/4160
1	500	1200	Whee.	125/250	2300/440
1	500	790	Cr. Wh.	575/000	2300
1	200	1200	Al. Ch.		
			3-unit	250	2300
1	300	1200	G.E.	250	2300
1	200	1200	Cr. Wb.	250	2300
1	200	1200	Elliott	125	4000/2300
1	200	900	G.E.	250	2300
1	175	1200	G.E.	250	440/220
2	150	1200	Whse.		
			8K	250	2300/440
2	150	1200	Reliance	125	2300/440
1	150	1200	G.E.	250	2300
1	100	1200	Whee.		
			8K	125/250	440/220
1	100	1200	Al. Ch.	250	4600/2300

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	DIRECT CURRENT MOTORS				
Qu.	H.P.	Make	Туре	Veits	B.P.M.
1	1500	Whee.	Encl.	525	600
1	1000	G.E.	Mill	600	150/300
1	1050	G.E.	MPC	550	89
1	675	Al. Ch.	Hev.	550	65
2	600	Al. Ch.	Mill	690	300/600
1 1 1	500	Whise,	Rev.	250	285/790
1	350	G.E.	CD 169A	238	1150
1	300	Whse.	Mill	230	386
2	275	Whse.	Mill	230	425/850
1	220/250	El. Dy.	Ped. Brg.	230	400/1200
1	180	G.E.	MPC	230	400
1	175	G.E.	CD 175A	230	850/1025
1	150	Whse.	SK 201	230	300/900
2	125	Whse.	SK 184	230	575/850
1	125	G,E.	MPC	230	400/800
1	100	El. Dy.	30 S	230	450/1350
1	80	Rel.	651 T	230	575/1150
2	75	Whse.	SK	238	250/1000
1	60/80	El. Dy.	25 8	230	525/1059
1	50	Whse.	8K 141	230	250/1000
1	35	Whee.	8K	230	250/1000
2	30/40	Whee.	8K 143	230	500/1500
21112111211213	20/25	Whse.	SK 121	230	200/1200
3	5/7%	Rel.	TEFC	230	337/1350

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1	2200	G.E.	MCF	600	400/500
1	1000	G.E.	MCF	600	350/700
1	940	Whoe.	QM	250	140/170
1	800	White.	400	250	450/550
1	500	Whae,	UC-216	600	300/900
3	450	Whae.		550	415
1	250	G.E.	MPC	230	400/600
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
1	150	Whee.	8K-151B	230	900/1800
1	125	Whse.	8K-183	230	850
1	120	G.E.	MFC	230	250/1000
2	100	Whse.	8K-181	230	450/1000
2	75	C.W.	53H-TEFC	230	860
1	50	G.E.	MD-412AE	230	550
1	50	Whse.	8K-131.5		
			B.B.D.P.	230	600/2290
4	30/40	Whee.	8K-131	280	500/1500

M-G Sets-3 ph. 60 Cy.

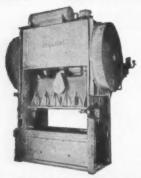
Qu.	K.W. 3000(3U)	Make G.E.	RP8 514	D.G. Volts 600	A.C. Velts 4000/6900/ 13200
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2000/2400 1750/2100 2000 2000 1500 1000 750 500	G.E. G.E. G.E. G.E. G.E. G.E.	450 514 500 514 720 906 720 908	250/300 1100 25cg 660 800 600 280 125/250 540/540	2300/4600 4000/6900/ 11000 2300/4600 6800/12240 4000/6940 2300/4600 4150
1	500	Whse.	900	125/250	440

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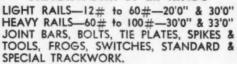
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#### METALWORKING BRIEFS

### AT&T Asks For \$38 Million Expansion

Permission to build \$38 million in additional facilities was filed by American Telephone & Telegraph Co. with the Federal Communications Commission. The new installations would include 3 million miles of long distance telephone lines, 2.8 million miles of teletypewriter lines and audio equipment for radio and TV networks.

#### International Harvester Recalls Workers

About 600 of the 1700 employes laid off by Inter-National Harvester Co. at its Memphis plant during the past two months will be recalled this month. More will be brought back in December and January. The plant produces all of I-H's mechanical cotton pickers and hay balers.

### MoPac To Build 2200 Freight Cars

Plans to build 2200 freight cars next year at a cost of about \$16.6 million were revealed by Missouri Pacific Railroad Co. About 200 of the cars will go to a subsidiary, Missouri-Illinois Railroad. The entire order will include 900 seventy-ton gondolas, 900 fifty-ton box cars and 200 pulpwood cars. They will be built in the company's De Soto, Mo., shops.

### Heavy Duty Trucks A First For S-P

Studebaker-Packard entered the heavy duty truck market for the first time with introduction of its 1957 line. A 182 hp V-8 engine is standard on heavy duty models and optional on two-ton, medium duty trucks. The new "Transtar" line, which includes ½-ton pickups to two-ton models, will cover 85 pct of the market, company officials say.

### Raytheon Gets Big Army Contract

Contracts for development and production of electronic military equipment totaling \$35 million were awarded by the Army to Raytheon Manufacturing Co., Waltham, Mass.

#### Ohio Seen As No. 1 Steel User

Ohio, the nation's second-ranking state in terms of steel capacity, may reach first place this year in another category—steel consumption, according to two top Republic Steel Corp. executives. C. M. White, board chairman, and T. F. Patton, president, predicted Ohio will get a major share of U. S. metal working sales which will rise to more than \$370 billion by 1970.

#### Strike Idles Woodward Iron Plant

Failure to reach agreement on new contracts caused a strike at Woodward Iron Co., Birmingham, idling 2500 workers. Only 700 blast furnace workers are involved in the negotiations.

An asterisk beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturer for your copies today.

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